EXPERT REPORT OF JOWEI CHEN, Ph.D.

October 15, 2018

I am an Associate Professor in the Department of Political Science at the University of Michigan, Ann Arbor. I am also a Research Associate Professor at the Center for Political Studies of the Institute for Social Research at the University of Michigan and a Research Associate at the Spatial Social Science Laboratory at Stanford University. In 2007, I received a M.S. in Statistics from Stanford University, and in 2009, I received a Ph.D. in political science from Stanford University. I have published academic papers on legislative districting and political geography in several political science journals, including *The American Journal of Political Science* and *The American Political Science Review*, and *Election Law Journal*. My academic areas of expertise include legislative elections, spatial statistics, geographic information systems (GIS) data, redistricting, racial politics, legislatures, and political geography. I have unique expertise in the use of computer simulations of legislative districting and to study questions related to political geography and redistricting.

I have provided expert reports in the following redistricting court cases: The League of Women Voters of Florida et al. v. Ken Detzner et al. (Fla. 2d Judicial Cir. Leon Cnty. 2012); Rene Romo et al. v. Ken Detzner et al. (Fla. 2d Judicial Cir. Leon Cnty. 2013); Missouri National Association for the Advancement of Colored People v. Ferguson-Florissant School District and St. Louis County Board of Election Commissioners (E.D. Mo. 2014); Raleigh Wake Citizens Association et al. v. Wake County Board of Elections (E.D.N.C. 2015); Corrine Brown et al. v. Ken Detzner et al. (N.D. Fla. 2015); City of Greensboro et al. v. Guilford County Board of Elections, (M.D.N.C. 2015); Common Cause et al. v. Robert A. Rucho et al. (M.D.N.C. 2016); The League of Women Voters of Pennsylvania et al. v. Commonwealth of Pennsylvania et al. (No. 261 M.D. 2017); Georgia State Conference of the NAACP et al v. The State of Georgia et al. (N.D. Ga. 2017); The League of Women Voters of Michigan et al. v. Ruth Johnson et al. (E.D. Mich. 2017). I have testified at trial in the following cases: Raleigh Wake Citizens Association et al. v. Wake County Board of Elections (E.D.N.C. 2015); City of Greensboro et al. v. Guilford County Board of Elections (M.D.N.C. 2015); Common Cause et al. v. Robert A. Rucho et al. (M.D.N.C. 2016); The League of Women Voters of Pennsylvania et al. v. Commonwealth of Pennsylvania et al. (No. 261 M.D. 2017). I am being compensated $500 per hour for my work in this case.

I was asked by plaintiffs' counsel to perform the following five tasks:

1) Construct a 'Chen Composite Measure' for the purpose of measuring the Republican vote share of Wisconsin Assembly districts. Construct the measure by using all 2004-2010 statewide election results, as listed in the column headings of Exhibit 464 ("EXH 464.xlsx"), and applying a uniform swing such that the average Republican vote share of the 99 Assembly Districts in the Act 43 plan is identical to the 48.58% average Republican vote share across the 99 Assembly Districts, as reported in Exhibit 172 ("EXH 172.pdf").

2) Generate a large number of computer-simulated districting plans for Wisconsin's Assembly districts with the following characteristics: A) The same or lower magnitude of population deviations as the Act 43 Assembly map; B) Fewer split counties than the Act 43 map; C) Fewer split municipalities than the Act 43 map; D) At least as many majority-African-American and majority-Hispanic districts as the Act 43 map; E) Fewer paired incumbents than the Act 43 map.

3) Among these computer-simulated plans, identify only those plans with an Efficiency Gap between -0.5% and +0.5%, with districts' partisanship measured using the Chen Composite Measure. Among the computer-simulated plans with an Efficiency Gap between -0.5% and +0.5%, identify the most compact plan, as measured by average Reock score.

4) Describe the characteristics of this identified computer-simulated plan and compare it to the enacted Act 43 plan.

5) Identify the districts in the computer-simulated plan and the enacted Act 43 plan in which each of 31 plaintiffs resides.

1. Constructing the 'Chen Composite Measure' of District-Level Republican Vote Share

Plaintiffs' counsel informed me that the drafters of the Act 43 map used all 13 of Wisconsin's 2004-2010 statewide elections in measuring the partisanship of Assembly districts, as listed in the column headings of Exhibit 464 ("EXH 464.xlsx"). Plaintiffs' counsel also informed me that Exhibit 172 ("EXH 172.pdf") reports the Act 43 drafters' measure of partisanship for each of the 99 Assembly districts in a near-final version of the Act 43 map. Specifically, plaintiffs' counsel informed me the "Final Map" referenced in Exhibit 172 is identical to the Assembly plan currently in use for all but four districts: Assembly Districts 8 and 9 (which were adjusted after the *Baldus* litigation) and Assembly Districts 98 and 99 (which were adjusted after the "Final Map" was created but before Act 43 was enacted).

From this exhibit, I determined that the Exhibit 172 measure of partisanship has an average Republican vote share of 48.58% across the 99 Assembly Districts in the "Final Map" referenced in this Exhibit. In Table 1, the fourth column lists these district-level Republican vote shares, as taken from Exhibit 172, and represents the information I used to calculate this average Republican vote share of 48.58% across the 99 Assembly Districts.

Plaintiffs' counsel then asked me to construct a composite measure of partisanship having both of these aforementioned characteristics: Specifically, I was instructed to construct a composite measure of partisanship by using all 2004-2010 statewide election results and applying a uniform swing such that the average Republican vote share of the 99 Assembly Districts in the Act 43 plan is identical to the 48.58% average Republican vote share across the 99 Assembly Districts, as reported in Exhibit 172.

I constructed this composite measure of partisanship using ward-level election data from Wisconsin's 2004-2010 elections, downloaded in a zipped file ("20022010_WI_Election_Data_with_2017_Wards.zip") from Wisconsin's Legislative Technology Services Bureau website.[1] I summed up the total number of votes cast in favor of Republican candidates and Democratic candidates during all 2004-2010 statewide elections within each ward. For each Act 43 Assembly District, I then calculated the Republican share of the two-party votes cast in all 2004-2010 statewide elections. These raw Republican vote shares for all Act 43 districts are reported in the second column of Table 1. Across all 99 Assembly Districts in the Act 43 map, the average district-level Republican vote share in the 2004-2010 statewide elections is 46.78%, as reported at the bottom of Table 1.

I then adjusted this raw Republican vote share by a uniform swing in order to match the 48.58% average Republican vote share across the 99 Assembly Districts, as reported in Exhibit 172 (and reproduced in the fourth column of Table 1). The difference between 48.58% (the district-level average from Exhibit 172) and 46.78% (the district-level average raw Republican share in the 2004-2010 statewide elections) is +1.8%. Thus, I applied a uniform swing of +1.8% to each district's raw Republican share in the 2004-2010 statewide elections in order to arrive at a resulting partisan measure whose district-level average across the 99 Act 43 districts is 48.58%. This resulting uniform-swing-adjusted partisan measure is reported in the third column of Table 1 and is hereinafter referred to as the 'Chen Composite Measure.'

[1] Downloaded from: https://data-ltsb.opendata.arcgis.com/datasets/2002-2010-wi-election-data-with-2017-wards

The Chen Composite Measure closely mimics the Act 43 drafters' measure of partisanship, as reported in Exhibit 172, in three important ways. First, at the level of the Act 43 Assembly Districts, the statistical correlation between the Chen Composite Measure and the Exhibit 172 partisanship measure is over 0.99, indicating a near-perfect correlation between the two measures. Second, both measures agree about which Act 43 Assembly Districts favor Republicans versus Democrats: The 59 districts with over 50% Republican vote share as measured by the Exhibit 172 partisanship measure are also the same 59 districts that have over 50% Republican vote share using the Chen Composite Measure. Similarly, the 40 districts that are under 50% Republican vote share in Exhibit 172 also all have under 50% Republican vote share using the Chen Composite Measure. Finally, the Chen Composite Measure has, by design, exactly the same average score across the 99 Act 43 Assembly Districts as the Exhibit 172 partisanship measure has across the 99 "Final Map" districts listed in Exhibit 172.

Figure 1 provides a visual comparison of the Chen Composite Measure and the Exhibit 172 partisanship measure. In this Figure, each Assembly District's partisanship, as measured by Exhibit 172, is shown along the vertical axis. Each Assembly District's Republican vote share, as measured by the Chen Composite Measure, is shown along the horizontal axis. Figure 1 makes visually clear that among Wisconsin's 99 Assembly districts, all but four districts have an Exhibit 172 partisanship measure virtually identical to their Chen Composite Measure. The four districts for which the Exhibit 172 partisanship measure is not virtually identical to the Chen Composite Measure are Assembly Districts 8, 9, 98, and 99. As explained earlier, plaintiffs' counsel informed me that the boundaries of these four districts were adjusted after the creation of Exhibit 172. Therefore, the correlation between the Chen Composite Measure and the Exhibit 172 partisanship measure would be even higher, but for the changing of these four districts' boundaries.

2. Generating Computer-Simulated Assembly Districting Plans

Plaintiffs' counsel asked me to generate a large number of computer-simulated districting plans for Wisconsin's Assembly districts with the following characteristics: A) The same or lower magnitude of population deviations as the Act 43 Assembly map; B) Fewer split counties than the Act 43 plan; C) Fewer split municipalities than the Act 43 plan; D) At least as many majority-African-American and majority-Hispanic districts as the Act 43 map; E) Fewer paired incumbents than the Act 43 map. More specifically, plaintiffs' counsel instructed me to hold frozen Assembly Districts 8 and 9 from the Act 43 map (using the boundaries of these two districts as adjusted after

the *Baldus* litigation). Holding these two districts frozen has the effect of matching the Act 43 map's creation of one majority-Hispanic district.

Table 2 describes the characteristics of the Act 43 Assembly map along these various aforementioned criteria. Below, I describe how the computer simulation algorithm implements these criteria:

1) Geographic Contiguity: The computer simulation algorithm I use for this report requires districts to be contiguous by land, with no point contiguity. In other words, a district that combines two areas is considered contiguous only if those two areas share a common border of non-zero length. Even when a ward contains geographically non-contiguous fragments, the district in which the ward lies is nevertheless required to be contiguous. Where offshore islands exist, these islands are considered to be contiguous with the mainland portions of their respective wards.

2) Equal Population: As of the 2010 Census, Wisconsin has a total statewide population of 5,686,986, so each of the state's 99 Assembly districts has an ideal district population of 57,444.3. In the Act 43 map, Assembly District 8, with a population of 57,196, deviates from this ideal district population by 248.3, which is the largest deviation among all districts in the Act 43 map. Therefore, I program the computer-simulated districting algorithm to require that all simulated districts have a population deviation of less than 248.3.

3) Minimizing Split Counties: After ensuring district contiguity and compliance with the equal population threshold, the simulation algorithm then seeks to minimize the number of counties split in each simulated districting plan. As Table 2 reports, the Act 43 map splits apart 58 of Wisconsin's 72 counties. Table 6 lists these 58 split counties in the Act 43 map. Thus, the simulation algorithm intentionally produces plans that split fewer than 58 total counties.

4) Minimizing Split Municipalities: The simulation algorithm also seeks to minimize the number of municipalities split in each simulated districting plan. As Table 2 reports, the Act 43 map splits apart 67 of Wisconsin's municipalities, which include cities, towns, and villages. Table 5 lists these 67 split municipalities in the Act 43 map. Thus, the simulation algorithm intentionally produces plans that split fewer than 67 total municipalities.

5) Majority-Minority Assembly Districts: The simulation algorithm requires plans to contain six districts with at least 50% African-American VAP, matching the Act 43 map's number of majority-African-American districts. In calculating the Black Voting Age Population of each district, I include only individuals who identify as single-race African-American. Additionally,

Assembly Districts 8 and 9 from the Act 43 map are frozen in every simulated plan, thus producing one district in each plan (District 8) with a majority-Hispanic VAP.

6) Avoiding Paired Incumbents: Plaintiffs' counsel provided me with a list of all 96 incumbent Assembly members as of the November 2012 election; the remaining three districts (Assembly districts 60, 83, and 94) contained no incumbent as of 2012. I geocoded the residential addresses of each incumbent to identify the district in which each incumbent resides in the Act 43 map and the computer-simulated maps.

As reported in Table 2, the Act 43 map contains 22 incumbents who were placed into a district containing multiple incumbents; the remaining 74 incumbents were the only incumbents in their respective districts. Therefore, I programmed the simulation algorithm to guarantee that fewer than 22 incumbents were paired, or placed into a district with multiple incumbents. Table 9 identifies the 22 paired (or "Not Protected") incumbents and the 74 non-paired (or "Protected") incumbents under the Act 43 plan.

The Computer Simulation Algorithm: The simulation algorithm proceeds as follows: First, the algorithm begins with a set of base geographies to be used as building blocks for constructing a simulated plan. In creating Assembly districting plans, I primarily use ward boundaries as the building blocks; however, I split up non-contiguous portions of single wards into separate building blocks in order to avoid creating non-contiguous Assembly districts. Specifically, in constructing this set of base geographies, I used Wisconsin's 2012 ward-level shapefile, which I downloaded in a zipped file (named "2012_wi_precincts.zip") from Wisconsin's Legislative Technology Services Bureau website.[2] This shapefile, produced by the Wisconsin LTSB, uses the Wisconsin Transverse Mercator projected coordinate system.[3] Thus, all subsequent calculations of district compactness of computer-simulated plans in this expert report are also based on this same projected coordinate system.

Second, the algorithm randomly divides up these geographies into an initial plan consisting of 97 simulated districts and two frozen districts (Assembly Districts 8 and 9 from the Act 43 map, as adjusted after the *Baldus* litigation). These 97 simulated districts are constructed in the following manner: First, the non-frozen portions of Wisconsin are randomly divided into two contiguous

[2] I downloaded the "2012_wi_precincts.zip" file on February 16, 2016. Although the file is no longer available on the Wisconsin LTSB website, a copy remains available on the following external URL: https://github.com/aaron-strauss/precinct-shapefiles/tree/master/wi

[3] Described at: https://epsg.io/3071

groups: One group consisting of 48/97ths of the total population, and the second group consisting of 49/97ths of the total population. Next, the 48/97ths group is randomly divided into two sub-groups, each consisting of 24/97ths of the total population. Meanwhile, the 49/97ths group is randomly divided into two subgroups, one consisting of 24/97ths and the second consisting of 25/97ths of the total population. These iterative sub-divisions continue until the non-frozen portions of Wisconsin are divided into 97 contiguous, equally-populated sub-groups.

Third, the computer then employs three Markov chain Monte Carlo (MCMC) algorithms to pursue various redistricting criteria. First, the algorithm evaluates a large number of randomly-proposed, iterative changes to the various boundaries between the districts; in each iteration, a proposed change is accepted only if the total number of majority-African-American districts does not decrease. These random, iterative changes continue until the districting map achieves a total of six majority-African-American VAP districts. The second MCMC algorithm considers yet more randomly-proposed, iterative changes to the district boundaries; proposed changes are accepted only if the number of paired incumbents does not increase and the number of majority-African-American VAP districts does not decrease. This second set of MCMC iterations continues until the number of paired incumbents falls below 22, which is the number of paired incumbents in the Act 43 map. Finally, the third MCMC algorithm accepts randomly-proposed, iterative changes to district boundaries only if the number of paired incumbents does not increase, the number of majority-African-American VAP districts does not decrease, and the total number of split county and municipality fragments does not increase. This third set of MCMC iterations continues until the plan contains significantly fewer than the 58 split counties and 67 split municipalities observed in the enacted Act 43 map. By considering and selectively implementing a large number of random iterative changes to the districts' boundaries, the algorithm thus gradually decreases the number of split counties, split municipalities, and paired incumbents in the plan, while matching the Act 43 map's six majority-African-American districts. These iterative changes result in a plan in which county and municipality boundaries are generally followed, except when splitting counties and municipalities is necessary for achieving one of the other aforementioned districting criteria.

In total, I conducted this entire simulation algorithm enough times to produce 9,452 separate districting plans. In the following section, I describe how I calculated certain characteristics of these simulated plans and identified one plan using a set of objective criteria.

3. Selecting a Single Simulated Assembly Plan

I was instructed by plaintiffs' counsel to identify, among the 9,452 computer-simulated plans, only those plans whose Efficiency Gap rounds to zero - that is, plans with an Efficiency Gap between -0.5% and +0.5%, with districts' partisanship measured using the Chen Composite Measure. I was further instructed to identify, among the computer-simulated plans with an Efficiency Gap between -0.5% and +0.5%, the most compact plan, as measured by average Reock score.

For each computer-simulated plan, I calculated each district's partisanship using the Chen Composite Measure by using the 2004-2010 statewide election votes and applying the same uniform swing described in the first section of this report. I then calculated the Efficiency Gap of each computer-simulated plan using the Chen Composite Measure to characterize each district's Republican vote share.

The Efficiency Gap is a commonly-used measure of a districting plan's partisan bias. To calculate the Efficiency Gap of each computer-simulated plan, I first calculated the number of Republican and Democratic voters within each district using the Chen Composite Measure, multiplied by the total number of two-party votes cast in statewide elections during 2004-2010. I then calculated each districting plan's Efficiency Gap using the method outlined in *Partisan Gerrymandering and the Efficiency Gap*[4]. Districts are classified as Democratic victories if, across these statewide elections, the sum total of Democratic votes in the district during these elections exceeds the sum total of Republican votes; otherwise, the district is classified as Republican. For each party, I then calculate the total sum of surplus votes in districts the party won and lost votes in districts where the party lost. Specifically, in a district lost by a given party, all of the party's votes are considered lost votes; in a district won by a party, only the party's votes exceeding the 50% threshold necessary for victory are considered surplus votes. A party's total wasted votes for an entire districting plan is the sum of its surplus votes in districts won by the party and its lost votes in districts lost by the party. The Efficiency Gap is then calculated as total wasted Democratic votes minus total wasted Republican votes, divided by the total number of two-party votes cast statewide across all 13 elections. Thus, a positive Efficiency Gap indicates more wasted Democratic than Republican votes, while a negative Efficiency Gap indicates more wasted Republican than Democratic votes.

[4] Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 University of Chicago Law Review 831 (2015).

I calculated the Efficiency Gap of each of the 9,452 computer-simulated plans described in the previous section. I then identified only those plans with an Efficiency Gap between -0.5% and +0.5%. Among these plans, I then identified the most compact plan, as measured by average Reock score. This process led to the identification of Simulated Map 43995.

4. Characteristics of Simulated Map 43995

Table 3 provides the following information regarding each district in the enacted Act 43 Map: (1) its population; (2) its Black Voting Age Population share; (3) its Hispanic Voting Age Population share; (4) its Reock compactness score; (5) its Polsby-Popper compactness score; and (6) its Republican vote share as measured by the Chen Composite Measure. Table 4 provides the same information regarding each district in Simulated Map 43995. Figure 2 includes a statewide map of the Act 43 Map's districts (Figure 2a), as well as zoomed-in maps detailing the districts in Milwaukee, Brown, Dane, Racine, and Kenosha Counties (Figure 2b). Figure 3 includes a statewide map of Simulated Map 43995's districts (Figure 3a), as well as zoomed-in maps detailing the districts in Milwaukee, Brown, Dane, Racine, and Kenosha Counties (Figure 3b). In all of these maps in Figures 2 and 3, all districts are shaded by partisanship using the Chen Composite Measure, with Democratic-leaning districts shaded from dark blue (most heavily Democratic) to light blue (least Democratic) and Republican-leaning districts shaded from dark red (most heavily Republican to light red (least Republican).

The maps in Figures 4 and 5 are all shaded at the ward level (using 2011 ward boundaries) by partisanship using the Chen Composite Measure, with Democratic-leaning wards shaded from dark blue (most heavily Democratic) to light blue (least Democratic) and Republican-leaning wards shaded from dark red (most heavily Republican to light red (least Republican). In addition to shading each ward by its partisanship, Figure 4a contains black lines depicting the boundaries of the Act 43 Map's districts for all of Wisconsin, while Figure 4b contains zoomed-in maps detailing the Act 43 Map's districts in Milwaukee, Brown, Dane, Racine, and Kenosha Counties. Similarly, Figure 5a contains black lines depicting the boundaries of Simulated Map 43995's districts for all of Wisconsin, while Figure 5b contains zoomed-in maps detailing Simulated Map 43995's districts in Milwaukee, Brown, Dane, Racine, and Kenosha Counties.

Table 2 compares the plan-wide characteristics of the Act 43 Map and Simulated Map 43995. Simulated Map 43995 pairs 18 incumbents (compared to 22 in the Act 43 Map), splits 43 counties (compared to 58 in the Act 43 Map), splits 53 municipalities (compared to 67 in the Act 43

Map), and contains districts within 248.3 of the ideal district population (identical to the maximum population deviation of the Act 43 Map). Table 7 lists the 53 municipalities split by Simulated Map 43995, while Table 8 lists the 43 counties split by Simulated Map 43995. Furthermore, Simulated Map 43995 has an average Reock compactness score of 0.402 (compared to 0.375 in the Act 43 Map) and an average Polsby-Popper compactness score of 0.271 (compared to 0.250 in the Act 43 Map). Table 9 lists the 96 Assembly incumbents, as of 2012, and identifies the Act 43 district and the Simulated Plan 43995 district within which each incumbent resides, thus identifying whether each incumbent is non-paired ("Protected") or paired ("Not Protected") within each of these two plans.

To calculate the compactness scores of the enacted Act 43 map, I first downloaded a shapefile of the Act 43 Assembly district boundaries from the Wisconsin LTSB website.[5] I found that this shapefile uses the World Geodetic System 1984 (WGS84) coordinate system.[6] I thus calculated the Reock and Polsby-Popper compactness scores for the Act 43 plan using this shapefile and its WGS84 coordinate system. This WGS84 coordinate system is different from the coordinate system used in the Wisconsin LTSB's ward shapefile described earlier in this report. However, I found that regardless of whether the Act 43 Map's compactness is calculated using the WGS84 coordinate system or the Wisconsin Transverse Mercator projected coordinate system used in the Wisconsin LTSB's ward shapefile, the Act 43 Map remains less geographically compact than Simulated Map 43995.

Finally, Figure 6 displays the Efficiency Gap of Simulated Map 43995 under different uniform swing conditions. Specifically, to create this Figure, I applied various alternative uniform swings to the Chen Composite Measure, ranging from -5% to +5% (at intervals of 0.1%). I then re-calculated the Efficiency Gap of Simulated Map 43995 under each of these uniform swing conditions, applying the same uniform swing to all districts in Simulated Map 43995. These Efficiency Gaps for each uniform swing condition are shown in Figure 6.

5. Plaintiffs' Districts in the Act 43 Map and Simulated Plan 43995

Plaintiffs' counsel provided me with a list of 31 plaintiffs, listed in Table 10, and their respective residential addresses. Plaintiffs asked me to identify the districts in the enacted Act 43 Map and in Simulated Plan 43995 in which each of these 31 plaintiffs resides.

[5] https://data-ltsb.opendata.arcgis.com/datasets/wisconsin-assembly-districts-2012
[6] https://epsg.io/4326

I geocoded each plaintiff's residential address and identified each plaintiff's district in the two plans. Table 10 specifies the following information about each of these 31 plaintiffs: (1) In which district in the Act 43 Map the plaintiff is located; (2) what this district's Republican vote share is using the Chen Composite Measure; (3) in which district in Simulated Plan 43995 the plaintiff resides; and (4) what this district's Republican vote share is using the Chen Composite Measure.

The end of this report contains a series of two maps for each of the 31 plaintiffs: One map depicting the plaintiff's residence within the plaintiff's Act 43 Assembly district, and a second map depicting the plaintiff's residence within the plaintiff's district in Simulated Plan 43995. In both maps, the plaintiff's district is shaded using the same blue-red color scale, based on the partisanship of the district (as measured by the Chen Composite Measure), as in Figures 2 and 3. In each map, the Republican vote share (as measured by the Chen Composite Measure) of the plaintiff's district is also reported in the third line in the third row of the header of the map.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my knowledge.

This 15th day of October, 2018.

Jowei Chen

Table 1: Comparison of Chen Composite Measure to Exhibit 172 Partisan Measure

Act 43 District:	Republican Share of 2004-2010 Statewide Election Votes:	Chen Composite Measure:	Exhibit 172 Partisan Measure (for "Final Plan"):
1	48.52%	50.32%	51.22%
2	52.60%	54.41%	54.84%
3	52.65%	54.46%	55.58%
4	51.88%	53.68%	53.47%
5	51.61%	53.41%	54.28%
6	55.21%	57.02%	58.33%
7	44.70%	46.50%	45.38%
8	22.57%	24.38%	30.48%
9	32.45%	34.25%	29.14%
10	12.35%	14.16%	12.59%
11	19.21%	21.01%	19.58%
12	27.17%	28.98%	27.51%
13	57.87%	59.67%	58.67%
14	57.78%	59.59%	58.64%
15	54.52%	56.32%	55.48%
16	10.45%	12.25%	10.54%
17	19.70%	21.50%	19.84%
18	14.85%	16.66%	14.94%
19	28.44%	30.25%	28.03%
20	42.28%	44.09%	43.12%
21	51.16%	52.96%	52.94%
22	64.45%	66.26%	66.82%
23	55.21%	57.01%	57.64%
24	56.33%	58.14%	58.49%
25	51.30%	53.10%	53.26%
26	54.53%	56.34%	55.97%
27	53.38%	55.19%	56.19%
28	52.22%	54.03%	55.00%
29	48.74%	50.54%	50.97%
30	51.50%	53.31%	53.78%
31	54.29%	56.10%	56.33%
32	59.49%	61.29%	62.28%
33	59.49%	61.30%	61.81%
34	52.77%	54.57%	55.22%
35	50.54%	52.35%	52.99%
36	51.59%	53.39%	54.84%
37	55.87%	57.68%	58.11%
38	57.98%	59.78%	60.45%
39	59.24%	61.04%	62.00%
40	55.13%	56.93%	58.07%
41	52.61%	54.42%	55.16%
42	53.01%	54.81%	54.94%
43	41.92%	43.72%	43.06%
44	36.51%	38.31%	37.22%
45	39.04%	40.84%	40.08%
46	40.57%	42.38%	42.39%
47	32.47%	34.27%	33.36%
48	27.45%	29.25%	27.56%
49	46.81%	48.61%	49.59%
50	50.39%	52.19%	52.06%

Act 43 District:	Republican Share of 2004-2010 Statewide Election Votes:	Chen Composite Measure:	Exhibit 172 Partisan Measure:
51	44.05%	45.85%	46.23%
52	56.87%	58.67%	59.06%
53	58.95%	60.76%	61.85%
54	45.29%	47.10%	45.22%
55	53.26%	55.06%	56.43%
56	56.55%	58.36%	57.59%
57	43.27%	45.08%	44.50%
58	67.34%	69.15%	70.54%
59	65.18%	66.99%	68.31%
60	66.45%	68.26%	69.52%
61	54.80%	56.60%	57.22%
62	54.36%	56.17%	56.56%
63	56.53%	58.33%	59.64%
64	41.70%	43.51%	42.72%
65	35.55%	37.36%	35.92%
66	31.20%	33.01%	31.71%
67	49.51%	51.31%	51.67%
68	47.10%	48.90%	49.38%
69	51.71%	53.52%	54.16%
70	48.63%	50.43%	50.73%
71	39.36%	41.17%	40.72%
72	49.05%	50.86%	51.49%
73	38.12%	39.93%	40.16%
74	40.53%	42.34%	42.89%
75	49.50%	51.30%	52.18%
76	15.00%	16.80%	14.49%
77	19.20%	21.00%	18.90%
78	30.39%	32.19%	31.38%
79	40.01%	41.81%	41.77%
80	37.40%	39.21%	38.55%
81	43.11%	44.91%	44.56%
82	55.33%	57.14%	57.08%
83	65.60%	67.40%	68.31%
84	56.22%	58.02%	57.10%
85	45.92%	47.73%	48.38%
86	52.32%	54.12%	55.08%
87	50.96%	52.77%	53.74%
88	51.34%	53.15%	53.19%
89	52.84%	54.65%	55.73%
90	39.82%	41.62%	40.40%
91	39.15%	40.96%	39.57%
92	42.15%	43.96%	44.30%
93	48.88%	50.69%	51.10%
94	49.87%	51.68%	51.91%
95	36.83%	38.63%	36.36%
96	44.44%	46.25%	46.40%
97	60.72%	62.53%	62.91%
98	64.90%	66.71%	74.85%
99	70.93%	72.74%	67.02%
Plan Average	**46.78%**	**48.58%**	**48.58%**

Table 2: Comparison of Act 43 Map and Computer-Simulated 43995 Map

	Act 43 Map:	**Computer-Simulated Map 43995:**
Total Assembly Districts:	99	99
Ideal District Population:	57,444.3	57,444.3
Maximum Population Deviation:	±248.3	±248.3
Districts Over 50% Black VAP:	6	6
Districts Over 50% Hispanic VAP:	1	1
Number of Paired Incumbents:	22	18
Number of Counties Split into Multiple Districts:	58	43
Number of Municipalities Split into Multiple Districts:	67	53
Mean Reock Compactness Score:	0.375	0.402
Mean Polsby-Popper Compactness Score:	0.250	0.271
Number of Republican-Leaning Districts (Using Chen Composite Measure):	59	47
Efficiency Gap (Using Chen Composite Measure):	-13.44%	+0.49%

Note: All calculations for both maps include Enacted Assembly Districts 8 and 9, which are frozen in Computer-Simulated Map 43995.

Table 3: District-Level Characteristics of the Act 43 Enacted Assembly Map

District	Total Population	Black Voting Age Population	Hispanic Voting Age Population	Reock Score	Polsby-Popper Score	Republican Vote Share (Chen Composite Measure)
1	57,220	0.33%	1.55%	0.158	0.077	50.32%
2	57,649	0.44%	1.36%	0.302	0.245	54.41%
3	57,444	0.50%	2.37%	0.410	0.205	54.46%
4	57,486	2.18%	1.99%	0.409	0.154	53.68%
5	57,470	0.39%	1.51%	0.399	0.252	53.41%
6	57,505	0.25%	1.79%	0.302	0.204	57.02%
7	57,498	4.31%	12.57%	0.304	0.202	46.50%
8	57,196	9.23%	67.68%	0.613	0.476	24.38%
9	57,283	6.01%	47.52%	0.405	0.193	34.25%
10	57,428	61.77%	3.73%	0.339	0.171	14.16%
11	57,503	61.54%	3.04%	0.349	0.188	21.01%
12	57,494	51.14%	4.17%	0.428	0.331	28.98%
13	57,452	2.18%	3.46%	0.215	0.258	59.67%
14	57,597	3.29%	1.85%	0.242	0.285	59.59%
15	57,372	2.08%	4.13%	0.228	0.336	56.32%
16	57,458	61.37%	4.65%	0.445	0.322	12.25%
17	57,354	61.09%	3.43%	0.403	0.368	21.50%
18	57,480	60.40%	5.36%	0.431	0.312	16.66%
19	57,546	5.23%	4.68%	0.244	0.161	30.25%
20	57,428	2.02%	8.66%	0.418	0.405	44.09%
21	57,449	2.15%	5.99%	0.542	0.511	52.96%
22	57,462	5.49%	1.52%	0.242	0.181	66.25%
23	57,579	1.84%	1.80%	0.237	0.170	57.01%
24	57,282	8.43%	2.06%	0.305	0.299	58.14%
25	57,322	0.48%	2.84%	0.356	0.385	53.10%
26	57,581	1.08%	5.39%	0.351	0.212	56.34%
27	57,536	0.60%	2.87%	0.516	0.248	55.19%
28	57,467	0.23%	1.22%	0.522	0.358	54.03%
29	57,537	0.62%	1.37%	0.313	0.351	50.54%
30	57,241	0.68%	1.54%	0.514	0.574	53.31%
31	57,244	2.16%	6.24%	0.450	0.231	56.10%
32	57,524	0.67%	8.65%	0.422	0.190	61.29%
33	57,566	0.37%	4.23%	0.226	0.178	61.30%
34	57,387	0.31%	0.72%	0.277	0.305	54.57%
35	57,562	0.24%	1.04%	0.425	0.454	52.35%
36	57,432	0.25%	1.22%	0.574	0.320	53.39%
37	57,507	0.69%	3.86%	0.174	0.145	57.68%
38	57,493	0.55%	2.81%	0.257	0.212	59.78%
39	57,387	0.51%	3.47%	0.500	0.333	61.04%
40	57,366	1.08%	1.89%	0.537	0.331	56.93%

District	Total Population	Black Voting Age Population	Hispanic Voting Age Population	Reock Score	Polsby-Popper Score	Republican Vote Share (Chen Composite Measure)
41	57,337	1.62%	3.92%	0.265	0.234	54.42%
42	57,285	1.63%	1.70%	0.376	0.208	54.81%
43	57,449	1.35%	3.57%	0.322	0.134	43.72%
44	57,385	2.29%	4.21%	0.489	0.062	38.31%
45	57,658	7.96%	8.43%	0.384	0.409	40.84%
46	57,458	2.98%	2.56%	0.370	0.226	42.38%
47	57,459	6.27%	10%	0.345	0.087	34.27%
48	57,512	7.58%	6.17%	0.349	0.050	29.25%
49	57,346	1.12%	1.05%	0.426	0.363	48.61%
50	57,624	1.30%	1.95%	0.425	0.269	52.19%
51	57,580	0.25%	2.01%	0.401	0.375	45.85%
52	57,232	1.78%	4.12%	0.298	0.264	58.67%
53	57,240	5.66%	1.45%	0.488	0.142	60.76%
54	57,250	1.26%	2.09%	0.419	0.066	47.10%
55	57,493	0.89%	3.09%	0.512	0.366	55.06%
56	57,582	0.51%	2.12%	0.262	0.178	58.36%
57	57,501	1.68%	4.89%	0.334	0.251	45.08%
58	57,227	0.59%	2.10%	0.482	0.152	69.15%
59	57,391	1.40%	1.79%	0.373	0.234	66.99%
60	57,385	0.61%	1.66%	0.442	0.255	68.26%
61	57,614	1.02%	3.99%	0.307	0.164	56.60%
62	57,345	4.39%	5%	0.237	0.341	56.17%
63	57,365	4.69%	4.46%	0.248	0.290	58.33%
64	57,270	7.73%	8.97%	0.181	0.076	43.51%
65	57,455	10.02%	15.44%	0.660	0.254	37.36%
66	57,545	23.99%	20.06%	0.314	0.171	33.01%
67	57,239	0.58%	0.90%	0.387	0.303	51.31%
68	57,266	1.65%	1.20%	0.451	0.253	48.90%
69	57,646	0.30%	3.05%	0.407	0.402	53.52%
70	57,554	0.82%	2.02%	0.216	0.163	50.43%
71	57,519	0.55%	1.91%	0.501	0.269	41.17%
72	57,449	0.37%	2.70%	0.417	0.371	50.86%
73	57,453	0.78%	0.87%	0.545	0.233	39.93%
74	57,494	0.15%	0.91%	0.420	0.143	42.34%
75	57,462	0.66%	1.29%	0.443	0.444	51.30%
76	57,617	4.42%	4.10%	0.208	0.240	16.80%
77	57,433	6.01%	6.76%	0.376	0.080	21.00%
78	57,548	4.90%	4.74%	0.559	0.065	32.19%
79	57,459	1.43%	2.61%	0.303	0.058	41.81%
80	57,585	1.49%	1.69%	0.505	0.351	39.21%
81	57,403	1.55%	2.92%	0.420	0.264	44.91%
82	57,430	4.02%	4.13%	0.539	0.444	57.14%

District	Total Population	Black Voting Age Population	Hispanic Voting Age Population	Reock Score	Polsby-Popper Score	Republican Vote Share (Chen Composite Measure)
83	57,423	0.29%	1.91%	0.286	0.228	67.40%
84	57,365	1.57%	5.28%	0.232	0.295	58.02%
85	57,480	0.81%	1.83%	0.369	0.194	47.73%
86	57,454	0.24%	1.13%	0.330	0.156	54.12%
87	57,358	0.27%	1.13%	0.305	0.341	52.77%
88	57,556	1.34%	6.22%	0.404	0.214	53.15%
89	57,634	0.49%	1.13%	0.288	0.170	54.65%
90	57,608	3.88%	13.23%	0.322	0.194	41.62%
91	57,359	0.92%	1.49%	0.365	0.072	40.96%
92	57,431	0.97%	3.18%	0.310	0.403	43.96%
93	57,546	0.28%	1.18%	0.212	0.176	50.69%
94	57,266	0.53%	0.89%	0.479	0.228	51.68%
95	57,372	1.70%	1.49%	0.248	0.086	38.63%
96	57,482	0.78%	1.31%	0.427	0.353	46.25%
97	57,279	1.63%	9.07%	0.374	0.245	62.53%
98	57,513	1.29%	4.51%	0.515	0.285	66.71%
99	57,528	0.44%	1.60%	0.422	0.309	72.74%

Table 4: District-Level Characteristics of Computer-Simulated Map 43995

District	Total Population	Black Voting Age Population	Hispanic Voting Age Population	Reock Score	Polsby-Popper Score	Republican Vote Share (Chen Composite Measure)
1	57,591	1.22%	6.18%	0.353	0.252	48.94%
2	57,503	7.30%	9.15%	0.364	0.107	36.13%
3	57,410	59.23%	3.17%	0.339	0.142	23.50%
4	57,574	2.18%	6.66%	0.359	0.189	47.81%
5	57,671	3.69%	2.83%	0.121	0.107	37.05%
6	57,378	0.45%	2.75%	0.534	0.419	64.11%
7	57,328	8.28%	12.70%	0.594	0.459	39.58%
8	57,623	1.07%	3.82%	0.422	0.268	44.92%
9	57,643	3.08%	7.15%	0.491	0.421	50.62%
10	57,617	1.78%	4.07%	0.501	0.210	58.86%
11	57,246	3.91%	5.91%	0.328	0.191	38.57%
12	57,484	0.81%	3.45%	0.429	0.359	68.48%
13	57,666	0.79%	10.54%	0.394	0.231	59.73%
14	57,333	1.52%	3.55%	0.407	0.168	40.15%
15	57,557	18.69%	9.54%	0.224	0.078	39.96%
16	57,408	16.15%	13.36%	0.272	0.183	45.74%
17	57,350	0.35%	1.68%	0.368	0.182	71.78%
18	57,246	54.25%	2.94%	0.324	0.204	24.93%
19	57,259	0.61%	2.08%	0.465	0.282	69.00%
20	57,256	0.39%	2.10%	0.372	0.123	66.81%
21	57,469	0.61%	0.96%	0.402	0.361	45.39%
22	57,521	2.59%	8.09%	0.347	0.154	50.65%
23	57,251	3.30%	4.99%	0.467	0.413	56.14%
24	57,494	1.53%	1.50%	0.544	0.355	66.18%
25	57,488	51.88%	2.91%	0.614	0.553	27.90%
26	57,265	0.28%	2.48%	0.394	0.288	52.61%
27	57,613	6.72%	9.94%	0.334	0.162	43.20%
28	57,445	5.04%	4.37%	0.460	0.118	25.30%
29	57,545	0.27%	1.03%	0.362	0.147	46.46%
30	57,327	2.07%	2.33%	0.233	0.164	44.00%
31	57,461	0.31%	2.10%	0.259	0.136	66.45%
32	57,440	0.53%	5.08%	0.437	0.338	59.60%
33	57,580	1.38%	4.18%	0.492	0.273	59.11%
34	57,361	4.93%	9.16%	0.231	0.146	40.05%
35	57,256	0.89%	1.75%	0.431	0.431	70.97%
36	57,311	6.54%	5.14%	0.392	0.112	31.16%
37	57,485	2.08%	4.82%	0.455	0.136	49.84%
38	57,673	1.43%	1.49%	0.457	0.306	57.54%
39	57,230	0.35%	2.20%	0.521	0.318	56.70%
40	57,257	12.03%	2.68%	0.416	0.188	47.30%

District	Total Population	Black Voting Age Population	Hispanic Voting Age Population	Reock Score	Polsby-Popper Score	Republican Vote Share (Chen Composite Measure)
41	57,673	0.27%	1.37%	0.332	0.267	55.81%
42	57,618	0.86%	2%	0.378	0.278	66.16%
43	57,361	2.12%	9.87%	0.355	0.089	60.29%
44	57,383	15.25%	11.89%	0.366	0.144	43.57%
45	57,313	9.62%	9.69%	0.354	0.327	43.25%
46	57,479	69.09%	4.49%	0.355	0.173	9.75%
47	57,360	54.56%	4.33%	0.269	0.109	15.24%
48	57,608	4.62%	2.77%	0.348	0.265	57.45%
49	57,530	0.20%	1.08%	0.549	0.533	52.95%
50	57,418	1.48%	3.51%	0.487	0.418	49.74%
51	57,331	1.38%	2.19%	0.421	0.252	55.58%
52	57,353	0.18%	1.01%	0.416	0.231	52.51%
53	57,284	2.09%	2.92%	0.393	0.210	54.84%
54	57,585	0.89%	4.16%	0.362	0.248	54.40%
55	57,524	1.04%	2.74%	0.300	0.169	54.93%
56	57,502	1.66%	2.53%	0.543	0.559	51.10%
57	57,463	0.57%	1.62%	0.503	0.334	56.40%
58	57,468	2.13%	1.43%	0.340	0.296	66.82%
59	57,357	1.01%	1.04%	0.347	0.170	45.29%
60	57,309	0.58%	2.10%	0.626	0.610	41.68%
61	57,413	0.41%	2.40%	0.324	0.151	57.95%
62	57,545	0.32%	3.04%	0.443	0.289	66.38%
63	57,593	1.81%	4.56%	0.369	0.160	45.42%
64	57,278	0.53%	2.11%	0.464	0.187	51.60%
65	57,583	1.93%	3.03%	0.358	0.244	36.29%
66	57,329	0.28%	0.91%	0.263	0.224	54.24%
67	57,341	0.22%	1.82%	0.437	0.375	56.78%
68	57,549	3.23%	1.99%	0.437	0.141	50.56%
69	57,280	4.28%	4.09%	0.666	0.502	58.18%
70	57,437	0.52%	2.58%	0.354	0.296	49.93%
71	57,417	0.63%	2.43%	0.488	0.347	66.41%
72	57,343	50.12%	4.36%	0.286	0.242	30.14%
73	57,371	1.37%	1.89%	0.348	0.264	50.97%
74	57,478	0.36%	1.83%	0.380	0.201	70.81%
75	57,445	1.50%	3.05%	0.314	0.252	48.47%
76	57,458	0.37%	0.75%	0.430	0.497	49.56%
77	57,501	0.42%	1.20%	0.234	0.175	49.49%
78	57,600	0.76%	0.86%	0.291	0.163	38.31%
79	57,541	6.29%	5.66%	0.403	0.185	27.45%
80	57,638	2.77%	3.81%	0.535	0.304	20.01%
81	57,409	1.01%	1.86%	0.521	0.207	52.18%
82	57,616	0.74%	1.52%	0.517	0.361	45.55%

District	Total Population	Black Voting Age Population	Hispanic Voting Age Population	Reock Score	Polsby-Popper Score	Republican Vote Share (Chen Composite Measure)
83	57,492	0.18%	2.93%	0.454	0.388	44.70%
84	57,552	0.28%	2.37%	0.390	0.396	45.31%
85	57,454	0.73%	0.99%	0.380	0.305	45.94%
86	57,672	0.57%	1.26%	0.441	0.260	49.81%
87	57,491	1.39%	1.91%	0.427	0.413	49.16%
88	57,557	0.66%	1.25%	0.456	0.577	51.18%
89	57,281	1.28%	1.37%	0.423	0.267	44.87%
90	57,406	0.54%	1.19%	0.304	0.238	45.70%
91	57,402	0.75%	1.70%	0.476	0.461	49.98%
92	57,555	1.09%	2.56%	0.318	0.278	46.42%
93	57,286	1.91%	1.07%	0.572	0.470	50.30%
94	57,523	0.18%	1.66%	0.343	0.277	52.99%
95	57,273	0.31%	1.49%	0.125	0.075	50.56%
96	57,288	2.59%	12.81%	0.434	0.328	48.03%
97	57,576	0.29%	1.20%	0.429	0.254	52.96%
E8	57,196	9.23%	67.68%	0.664	0.491	24.38%
E9	57,283	6.01%	47.52%	0.335	0.191	34.25%

Note: 'E8' and 'E9' denote the Enacted Act 43 Plan's Assembly Districts 8 and 9, which are frozen in Computer-Simulated Map 43995. The remaining 97 districts (numbered from 1 to 97), represent computer-simulated districts.

Table 5: List of 67 Municipalities Split into Multiple Districts in Enacted Act 43 Plan

De Pere city (2, 88)
Green Bay city (1, 4, 88, 90)
Howard village (4, 5, 89)
Ledgeview town (2, 88)
Eau Claire city (68, 91)
Cottage Grove town (46, 47)
DeForest village (37, 42)
Dunkirk town (43, 46)
Fitchburg city (47, 80)
Madison city (47, 48, 76, 77, 78)
Middleton city (78, 79)
Oregon village (43, 80)
Verona city (79, 80)
Verona town (79, 80)
Windsor town (37, 42, 79)
Lowell town (37, 39)
Eau Claire city (68, 91, 93)
Calumet town (52, 59)
Fond du Lac town (52, 53)
Mount Pleasant town (45, 80)
Koshkonong town (33, 43)
Kenosha city (61, 64, 65)
Somers town (61, 64)
Shelby town (94, 95)
Meeme town (25, 27)
Franklin city (21, 82, 83)
Glendale city (11, 24)
Greenfield city (7, 82, 84)
Milwaukee city (8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 7, 84)
Wauwatosa city (12, 13, 14)
West Allis city (13, 15, 7)
Appleton city (55, 56, 57)
Grand Chute town (55, 56, 57)
Greenville town (55, 56)
Little Chute village (3, 5)
Mequon city (23, 24)
Grant town (71, 72)
Burlington town (32, 63)
Caledonia village (62, 63)
Mount Pleasant village (62, 63, 64)
Racine city (62, 64, 66)
Beloit city (31, 45)
Beloit town (31, 45)
Harmony town (31, 44)
Janesville city (31, 44)
Richmond town (29, 30)
Wisconsin Dells city (41, 81)
Sheboygan city (26, 27)
Sheboygan Falls city (26, 27)
East Troy town (32, 33, 83)
Hartford city (39, 59)
Richfield village (22, 58)
Trenton town (58, 60)
Brookfield city (13, 14)
Brookfield town (13, 14)
Genesee town (97, 99)
Lisbon town (22, 98)
Menomonee Falls village (22, 24)
Mukwonago town (33, 97)
New Berlin city (15, 84)
Oconomowoc town (38, 99)
Summit village (38, 99)
Waukesha city (97, 98)
Waukesha town (83, 97)
Menasha town (55, 57)
Oshkosh city (53, 54)
Marshfield city (69, 86)

Table 6: List of 58 Counties Split into Multiple Districts in Enacted Act 43 Plan

Adams County (41, 72)
Barron County (67, 75)
Brown County (1, 2, 4, 5, 6, 88, 89, 90)
Buffalo County (92, 93)
Burnett County (28, 73, 75)
Calumet County (25, 27, 3, 59)
Chippewa County (67, 68, 91)
Clark County (68, 69, 87)
Columbia County (37, 41, 42, 81)
Dane County (37, 38, 42, 43, 46, 47, 48, 76, 77, 78, 79, 80, 81)
Dodge County (37, 39, 42, 53)
Douglas County (73, 74)
Dunn County (29, 67, 75, 93)
Eau Claire County (68, 91, 93)
Fond du Lac County (41, 42, 52, 53, 59)
Forest County (34, 36)
Green County (45, 51, 80)
Green Lake County (41, 42)
Iowa County (49, 51, 80, 81)
Jackson County (68, 70, 92)
Jefferson County (33, 37, 38, 43)
Juneau County (41, 50)
Kenosha County (32, 61, 64, 65)
La Crosse County (94, 95)
Lafayette County (49, 51)
Langlade County (35, 36)
Manitowoc County (1, 2, 25, 27)
Marathon County (35, 69, 85, 86, 87)
Marinette County (36, 89)
Marquette County (41, 42)
Milwaukee County (8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 7, 82, 83, 84)
Monroe County (50, 70, 96)
Oconto County (36, 6, 89)
Oneida County (34, 35)
Outagamie County (2, 3, 40, 5, 55, 56, 57, 6)
Ozaukee County (23, 24, 60)
Pierce County (30, 93)
Polk County (28, 75)
Portage County (70, 71, 72)
Racine County (32, 62, 63, 64, 66, 83)
Richland County (49, 50, 51)
Rock County (31, 43, 44, 45)
St. Croix County (28, 29, 30, 75, 93)
Sauk County (41, 50, 51, 81)
Sawyer County (74, 87)
Shawano County (35, 36, 40, 6)
Sheboygan County (26, 27, 59)
Trempealeau County (68, 92)
Vernon County (50, 96)
Vilas County (34, 74)
Walworth County (31, 32, 33, 43, 63, 83)
Washburn County (73, 75)
Washington County (22, 24, 39, 58, 59, 60)
Waukesha County (13, 14, 15, 22, 24, 33, 38, 83, 84, 97, 98, 99)
Waupaca County (40, 6)
Waushara County (40, 41, 72)
Winnebago County (53, 54, 55, 56, 57)
Wood County (69, 70, 72, 86)

Table 7: List of 53 Municipalities Split into Multiple Districts in Simulated Plan 43995

Allouez village (37, 53)
Green Bay city (37, 51, 96)
Hobart village (2, 51, 61)
Blooming Grove town (2, 28, 36)
Bristol town (30, 87)
Burke town (2, 36)
Dunkirk town (11, 8)
Fitchburg city (11, 2)
Madison city (2, 28, 36, 65, 79, 80)
Madison town (2, 79, 80)
Middleton town (65, 79)
Sun Prairie city (2, 30)
Westport town (30, 36)
Eau Claire city (82, 90, 93)
Union town (82, 90)
Fond du Lac town (10, 31)
Exeter town (11, 84)
Kenosha city (27, 33, 61, 7)
Pleasant Prairie village (27, 33)
La Crosse city (59, 89)
Onalaska town (59, 89)
Stettin town (91, 97)
Franklin city (20, 69)
Greenfield city (20, 22)
Milwaukee city (15, 18, 22, 25, 3, 34, 40, 46, 47, 5, 72, E8, E9)
Oak Creek city (23, 4, 69)
West Allis city (22, 9)
Appleton city (39, 50, 64)
Grand Chute town (39, 50, 54, 64)
Kaukauna city (39, 64)
Grafton town (24, 71)
Burlington town (33, 62)
Mount Pleasant village (16, 44)
Racine city (16, 23, 44)
Janesville city (14, 63)
Sheboygan city (1, 71)
Sheboygan Falls city (1, 27, 38)
Geneva town (13, 62)
Lyons town (13, 62)
Sugar Creek town (13, 63)
Germantown village (19, 35)
Brookfield city (42, 58)
Delafield town (12, 17)
New Berlin city (20, 42)
Ottawa town (17, 74)
Waukesha city (12, 43)
Waukesha town (20, 43)
Weyauwega city (55, 67)
Weyauwega town (55, 67)
Algoma town (54, 81)
Menasha city (54, 68)
Oshkosh city (53, 68, 81)
Rushford town (55, 81)

Note: 'E8' and 'E9' denote the Enacted Act 43 Plan's Assembly Districts 8 and 9, which are frozen in Computer-Simulated Map 43995. The remaining 97 districts (numbered from 1 to 97), represent computer-simulated districts.

Table 8: List of 43 Counties Split into Multiple Districts in Simulated Plan 43995:

Bayfield County (29, 78)
Brown County (2, 37, 51, 53, 61, 96)
Burnett County (49, 78)
Calumet County (3, 38, 61)
Chippewa County (67, 77, 93)
Clark County (26, 90)
Columbia County (48, 87)
Dane County (11, 2, 28, 30, 36, 46, 65, 79, 8, 80, 87)
Dodge County (48, 6)
Dunn County (77, 82, 86)
Eau Claire County (82, 90, 93)
Fond du Lac County (10, 31, 42, 53, 81)
Grant County (21, 85, 92)
Green County (11, 84)
Green Lake County (48, 55)
Jackson County (56, 83, 92)
Jefferson County (32, 8)
Juneau County (50, 73, 75)
Kenosha County (27, 33, 61, 7)
La Crosse County (59, 89)
Manitowoc County (38, 70, 95)
Marathon County (86, 91, 94, 97)
Milwaukee County (15, 18, 20, 22, 23, 25, 3, 34, 4, 40, 46, 47, 5, 69, 72, 9, E8, E9)
Oconto County (41, 51, 52)
Oneida County (29, 66, 76)
Outagamie County (39, 50, 54, 64)
Ozaukee County (24, 60, 71)
Portage County (55, 60, 71)
Price County (29, 94)
Racine County (16, 23, 33, 44, 62)
Rock County (14, 45, 63, 84)
Rusk County (93, 94)
St. Croix County (57, 86)
Sauk County (75, 81, 92)
Shawano County (41, 67)
Sheboygan County (1, 27, 38, 71)
Walworth County (13, 62, 63)
Washburn County (78, 88)
Washington County (19, 31, 35, 58, 59, 60)
Waukesha County (12, 17, 20, 42, 43, 58, 74)
Waupaca County (55, 67)
Winnebago County (53, 54, 55, 68, 81)
Wood County (26, 73)

Note: 'E8' and 'E9' denote the Enacted Act 43 Plan's Assembly Districts 8 and 9, which are frozen in Computer-Simulated Map 43995. The remaining 97 districts (numbered from 1 to 97), represent computer-simulated districts.

Table 9: Incumbent Representatives as of November 2012

2002 Enacted Plan District:	Incumbent Name:	Act 43 Enacted Plan District:	Simulated Plan 43995 District:
1	Garey Bies	1 (Protected)	95 (Protected)
2	Andre Jacque	88 (Not Protected)	53 (Protected)
3	Al Ott	3 (Protected)	61 (Protected)
4	Chad Weininger	4 (Protected)	37 (Protected)
5	Jim Steineke	5 (Protected)	64 (Protected)
6	Gary Tauchen	6 (Protected)	41 (Protected)
7	Margaret Krusick	7 (Not Protected)	15 (Protected)
8	JoCasta Zamarripa	8 (Protected)	E8 (Protected)
9	Josh Zepnick	7 (Not Protected)	22 (Protected)
10	Elizabeth Coggs	10 (Protected)	46 (Protected)
11	Jason Fields	11 (Protected)	25 (Protected)
12	Fredrick Kessler	22 (Not Protected)	72 (Protected)
13	David Cullen	14 (Not Protected)	03 (Not Protected)
14	Dale Kooyenga	14 (Not Protected)	42 (Protected)
15	Tony Staskunas	15 (Protected)	09 (Protected)
16	Leon Young	16 (Protected)	47 (Protected)
17	Barbara Toles	17 (Protected)	03 (Not Protected)
18	Tamara Grigsby	18 (Protected)	40 (Protected)
19	Jon Richards	19 (Protected)	05 (Not Protected)
20	Christine Sinicki	20 (Protected)	34 (Protected)
21	Mark Honadel	21 (Protected)	04 (Protected)
22	Sandy Pasch	23 (Not Protected)	05 (Not Protected)
23	Jim Ott	23 (Not Protected)	24 (Protected)
24	Dan Knodl	24 (Protected)	35 (Not Protected)
25	Bob Ziegelbauer	25 (Protected)	70 (Protected)
26	Mike Endsley	26 (Protected)	01 (Protected)
27	Steve Kestell	27 (Protected)	38 (Protected)
28	Erik Severson	28 (Protected)	49 (Protected)
29	John Murtha	29 (Protected)	86 (Protected)
30	Dean Knudson	30 (Protected)	57 (Protected)
31	Steve Nass	33 (Not Protected)	63 (Not Protected)
32	Tyler August	31 (Not Protected)	13 (Protected)
33	Chris Kapenga	99 (Protected)	17 (Protected)
34	Dan Meyer	34 (Protected)	66 (Protected)
35	Tom Tiffany	35 (Protected)	76 (Protected)
36	Jeff Mursau	36 (Protected)	52 (Not Protected)
37	Andy Jorgensen	33 (Not Protected)	08 (Protected)
38	Joel Kleefisch	38 (Protected)	74 (Protected)
39	Jeff Fitzgerald	39 (Protected)	06 (Protected)
40	Kevin Petersen	40 (Protected)	67 (Protected)
41	Joan Ballweg	41 (Protected)	48 (Protected)

2002 Enacted Plan District:	Incumbent Name:	Act 43 Enacted Plan District:	Simulated Plan 43995 District:
42	Fred Clark	81 (Protected)	92 (Not Protected)
43	Evan Wynn	43 (Protected)	63 (Not Protected)
44	Joe Knilans	44 (Protected)	14 (Protected)
45	Amy Loudenbeck	31 (Not Protected)	45 (Protected)
46	Gary Hebl	46 (Protected)	02 (Protected)
47	Keith Ripp	42 (Protected)	30 (Protected)
48	Joe Parisi	48 (Not Protected)	28 (Protected)
49	Travis Tranel	49 (Protected)	21 (Protected)
50	Ed Brooks	50 (Protected)	75 (Protected)
51	Howard Marklein	51 (Protected)	92 (Not Protected)
52	Jeremy Thiesfeldt	52 (Protected)	10 (Protected)
53	Richard Spanbauer	53 (Protected)	54 (Protected)
54	Gordon Hintz	54 (Protected)	81 (Protected)
55	Dean Kaufert	55 (Protected)	68 (Not Protected)
56	Michelle Litjens	56 (Protected)	68 (Not Protected)
57	Penny Bernard Schaber	57 (Protected)	50 (Protected)
58	Patricia Strachota	58 (Protected)	19 (Protected)
59	Daniel LeMahieu	59 (Protected)	71 (Protected)
60	VACANT		
61	Robert Turner	66 (Protected)	16 (Protected)
62	Cory Mason	62 (Protected)	44 (Protected)
63	Robin Vos	63 (Protected)	62 (Protected)
64	Peter Barca	64 (Protected)	07 (Protected)
65	John Steinbrink	61 (Not Protected)	27 (Protected)
66	Samantha Kerkman	61 (Not Protected)	33 (Protected)
67	Tom Larson	67 (Protected)	77 (Protected)
68	Kathy Bernier	68 (Protected)	93 (Protected)
69	Scott Suder	69 (Protected)	26 (Not Protected)
70	Amy Sue Vruwink	70 (Protected)	26 (Not Protected)
71	Louis Molepske, Jr.	71 (Protected)	60 (Protected)
72	Scott Krug	72 (Protected)	73 (Protected)
73	Nick Milroy	73 (Protected)	78 (Protected)
74	Janet Bewley	74 (Protected)	29 (Protected)
75	Roger Rivard	75 (Protected)	88 (Protected)
76	Terese Berceau	77 (Protected)	79 (Not Protected)
77	Brett Hulsey	78 (Protected)	79 (Not Protected)
78	Mark Pocan	76 (Protected)	80 (Protected)
79	Sondy Pope-Roberts	79 (Protected)	65 (Protected)
80	Janis Ringhand	45 (Protected)	84 (Protected)
81	Kelda Helen Roys	48 (Not Protected)	36 (Protected)
82	Jeff Stone	82 (Protected)	69 (Protected)
83	VACANT		
84	Mike Kuglitsch	84 (Protected)	20 (Protected)

2002 Enacted Plan District:	Incumbent Name:	Act 43 Enacted Plan District:	Simulated Plan 43995 District:
85	Donna Seidel	85 (Protected)	91 (Protected)
86	Jerry Petrowski	86 (Protected)	97 (Protected)
87	Mary Williams	87 (Protected)	94 (Protected)
88	John Klenke	88 (Not Protected)	96 (Protected)
89	John Nygren	89 (Not Protected)	52 (Not Protected)
90	Karl Van Roy	89 (Not Protected)	51 (Protected)
91	Chris Danou	92 (Not Protected)	83 (Protected)
92	Mark Radcliffe	92 (Not Protected)	56 (Protected)
93	Warren Petryk	93 (Protected)	82 (Protected)
94	VACANT		
95	Jennifer Shilling	95 (Protected)	89 (Protected)
96	Lee Nerison	96 (Protected)	85 (Protected)
97	Bill Kramer	97 (Protected)	43 (Protected)
98	Paul Farrow	98 (Protected)	12 (Protected)
99	Don Pridemore	22 (Not Protected)	35 (Not Protected)

Table 10: Act 43 Districts and Simulated Plan 43995 Districts in which 31 Plaintiffs Reside

Plaintiff	Act 43 District	Republican Vote Share of Act 43 District (Chen Composite Measure)	Simulated Plan 43995 District	Republican Vote Share of Simulated District (Chen Composite Measure)
Graham Adsit	38	59.78%	8	44.92%
Roger Anclam	31	56.10%	45	43.25%
Warren Braun	13	59.67%	40	47.30%
Hans Breitenmoser	35	52.35%	76	49.56%
Judith Brey	50	52.19%	75	48.47%
Sandra Carlson-Kaye	18	16.66%	15	39.96%
Guy Costello	21	52.96%	4	47.81%
Timothy B. Daley	63	58.33%	16	45.74%
Daniel Dieterich	70	50.43%	60	41.68%
Mary Lynne Donohue	26	56.34%	1	48.94%
Leah Dudley	77	21.00%	2	36.13%
Jennifer Estrada	25	53.10%	70	49.93%
Barbara Flom	29	50.54%	86	49.81%
Helen Harris	22	66.25%	72	30.14%
Gail Hohenstein	88	53.15%	96	48.03%
Elizabeth Lentini	23	57.01%	5	37.05%
Norah McCue	62	56.17%	44	43.57%
Janet Mitchell	66	33.01%	44	43.57%
Deborah Patel	24	58.14%	18	24.93%
Jane Pedersen	67	51.31%	86	49.81%
Nancy Petulla	86	54.12%	91	49.98%
Robert Pfundheller	93	50.69%	82	45.55%
Sara Ramaker	4	53.68%	37	49.84%
Rosalie Schnick	95	38.63%	59	45.29%
Allison Seaton	42	54.81%	87	49.16%
James Seaton	42	54.81%	87	49.16%
Linea Sundstrom	10	14.16%	5	37.05%
Michael Switzenbaum	23	57.01%	5	37.05%
Jerome Wallace	23	57.01%	5	37.05%
Edward Wohl	80	39.21%	21	45.39%
Ann Wolfe	80	39.21%	21	45.39%

Figure 1:
Comparison of Chen Composite Measure (for Act 43 Districts)
to Exhibit 172 Partisan Measure (for "Final Plan")
(Numbers indicate district numbers)

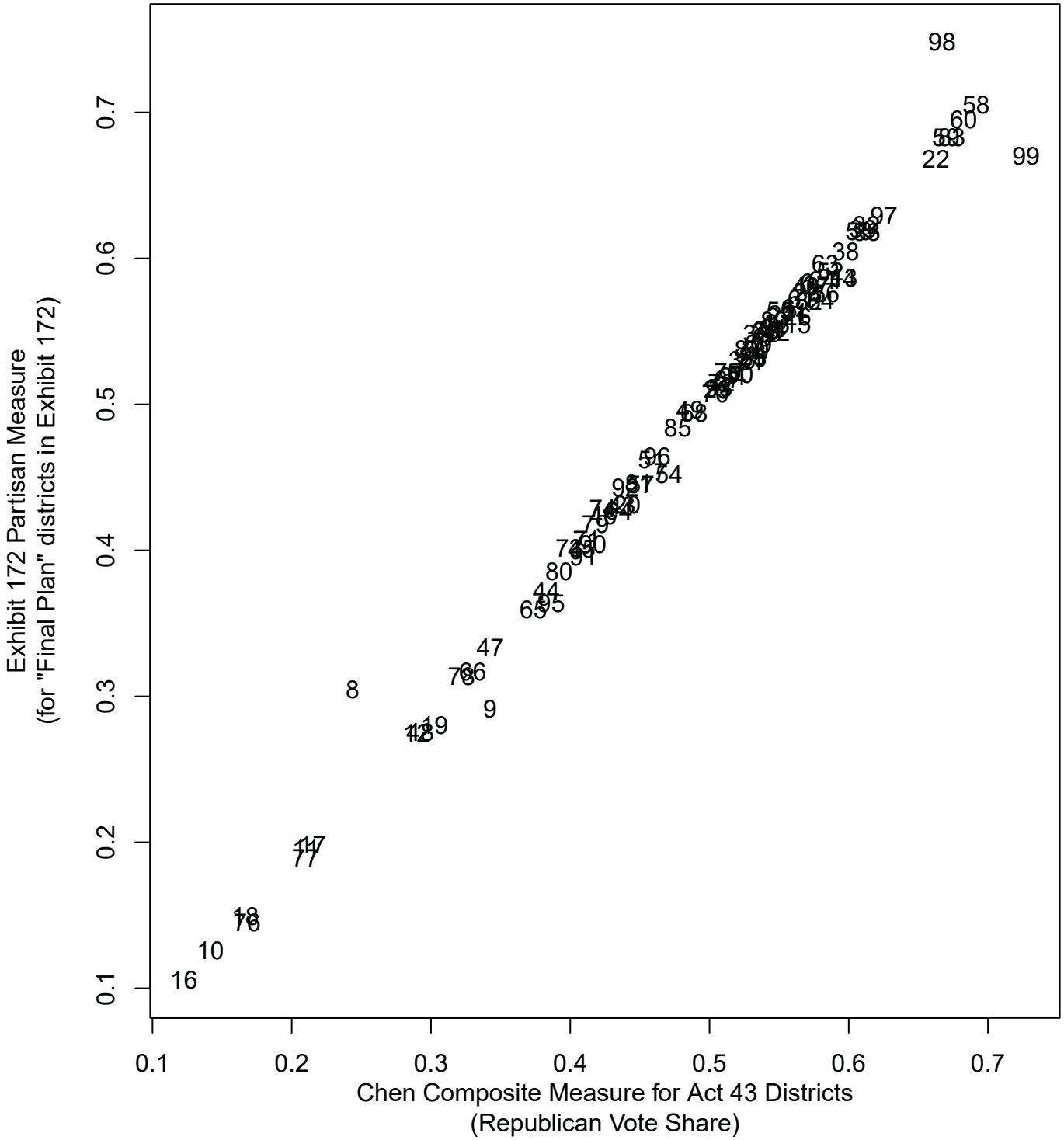


Figure 2a:
Act 43 Assembly District−Level Republican Vote Share (Chen Composite Measure)

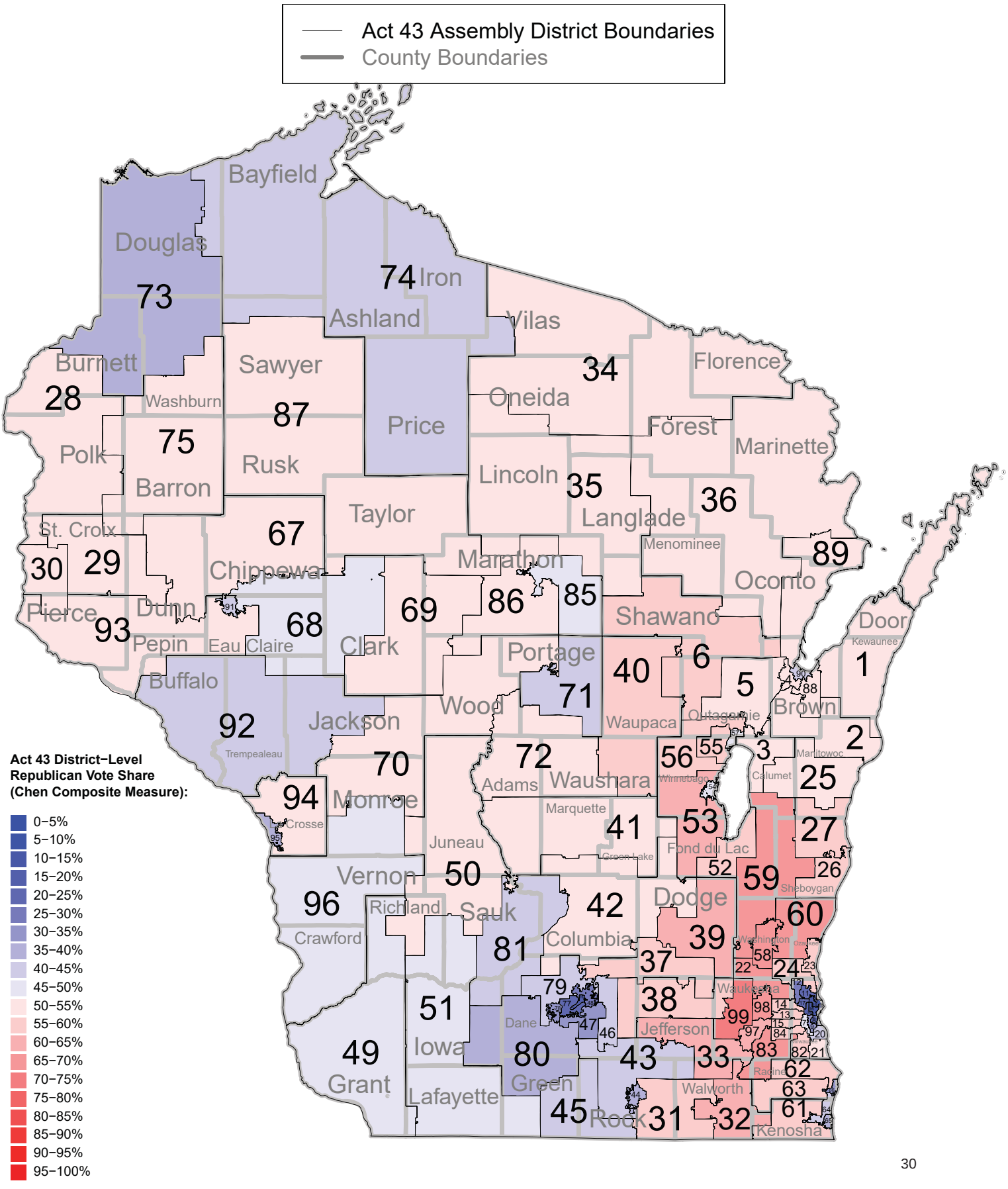


Figure 2b: Act 43 Map District-Level Republican Vote Share (Chen Composite Measure)

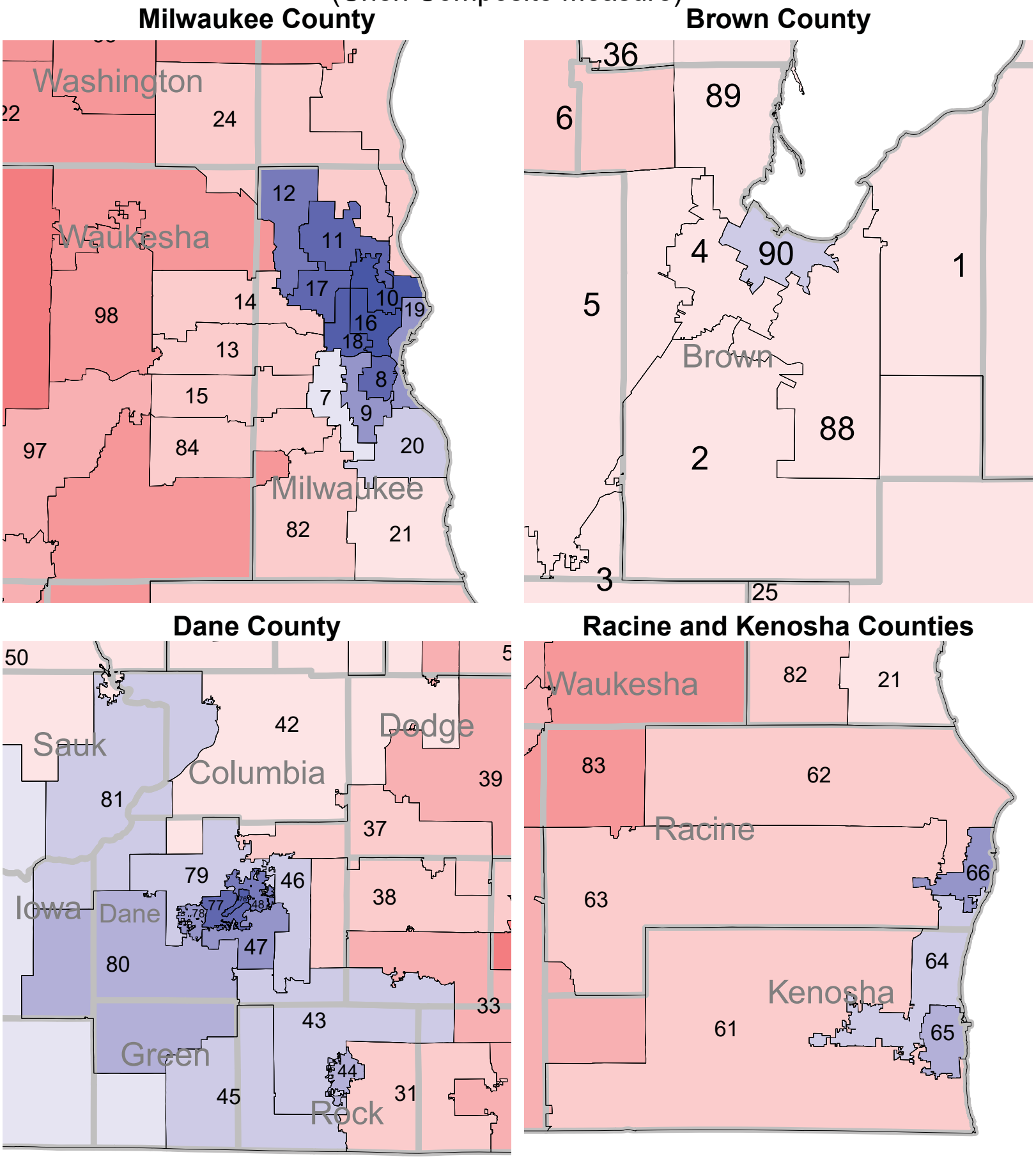


Figure 3a:
Simulated Plan 43995 District−Level Republican Vote Share (Chen Composite Measure)

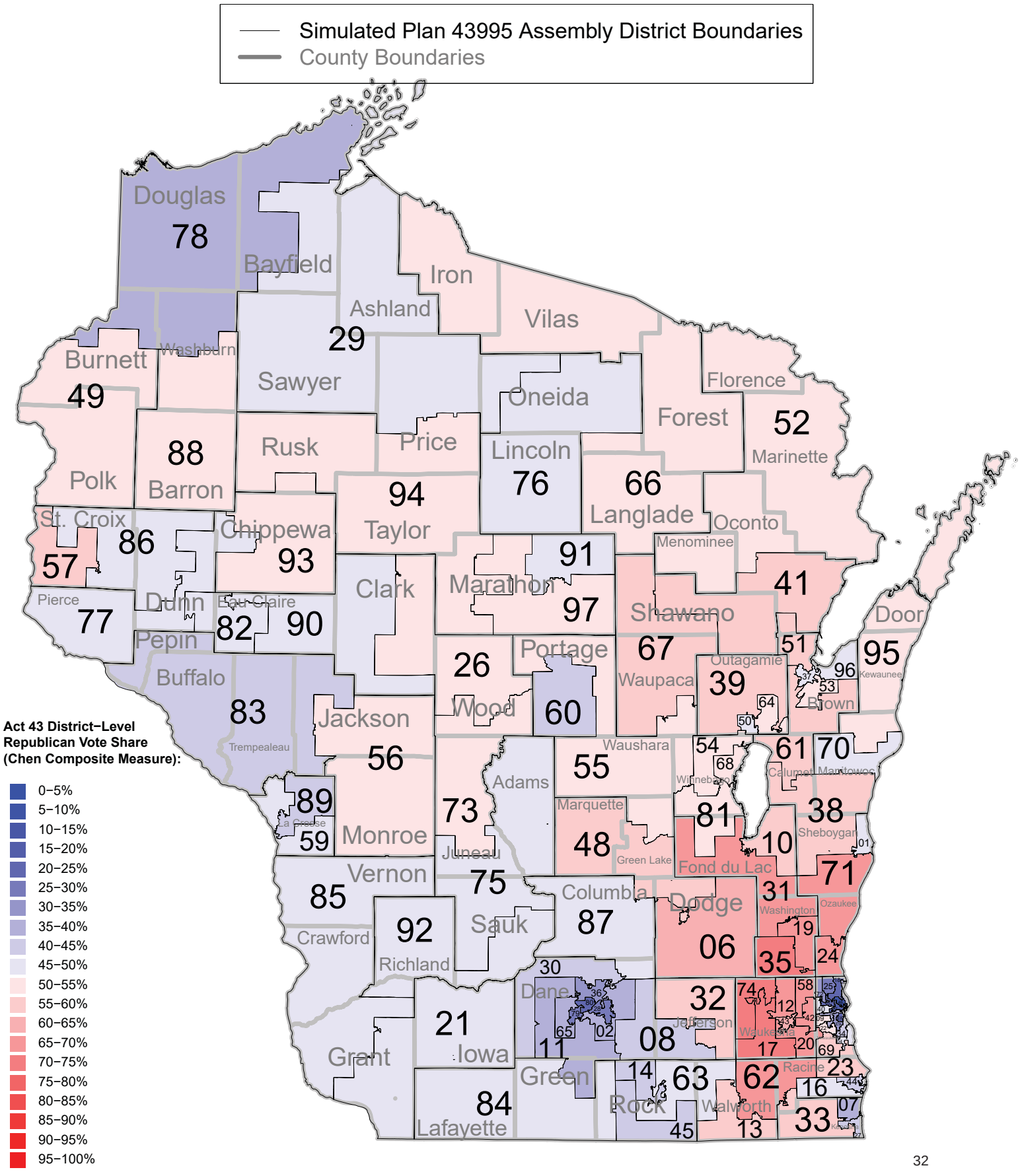


Figure 3b: Simulated Plan 43995 District-Level Republican Vote Share (Chen Composite Measure)

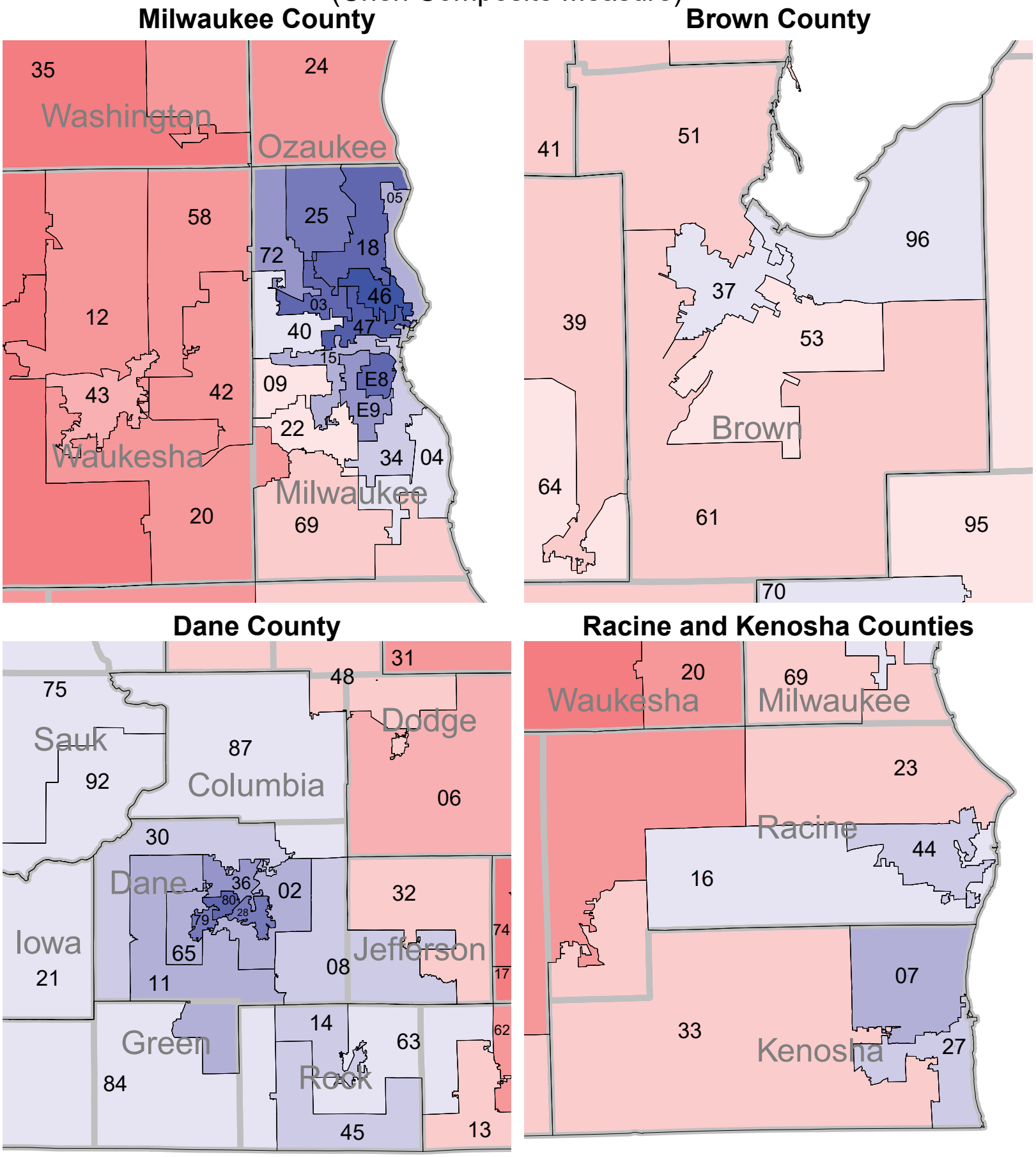


Figure 4a:
Ward−Level Republican Vote Share
(Chen Composite Measure)

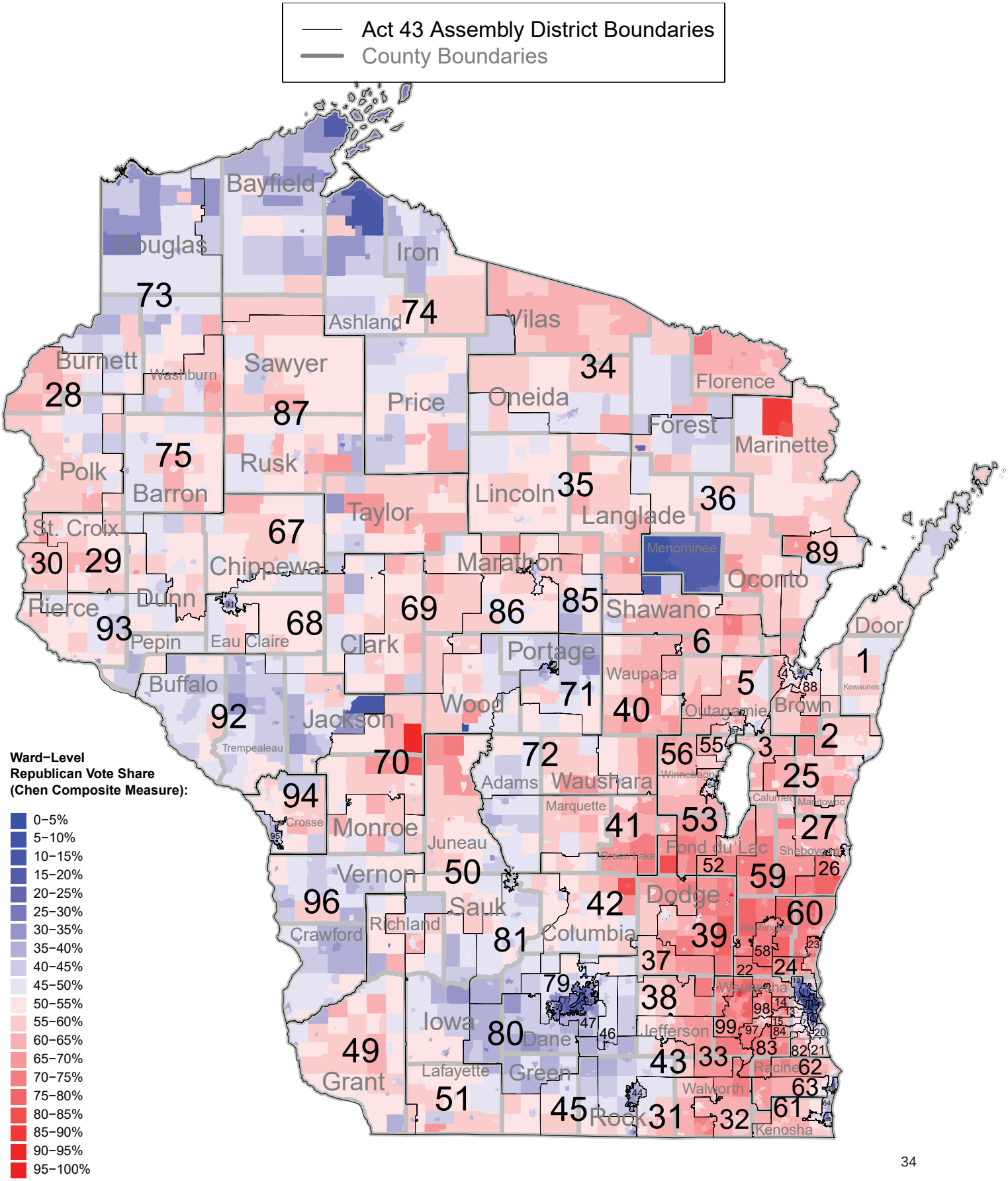


Figure 4b: Ward-Level Republican Vote Share (Chen Composite Measure) And Act 43 District Boundaries

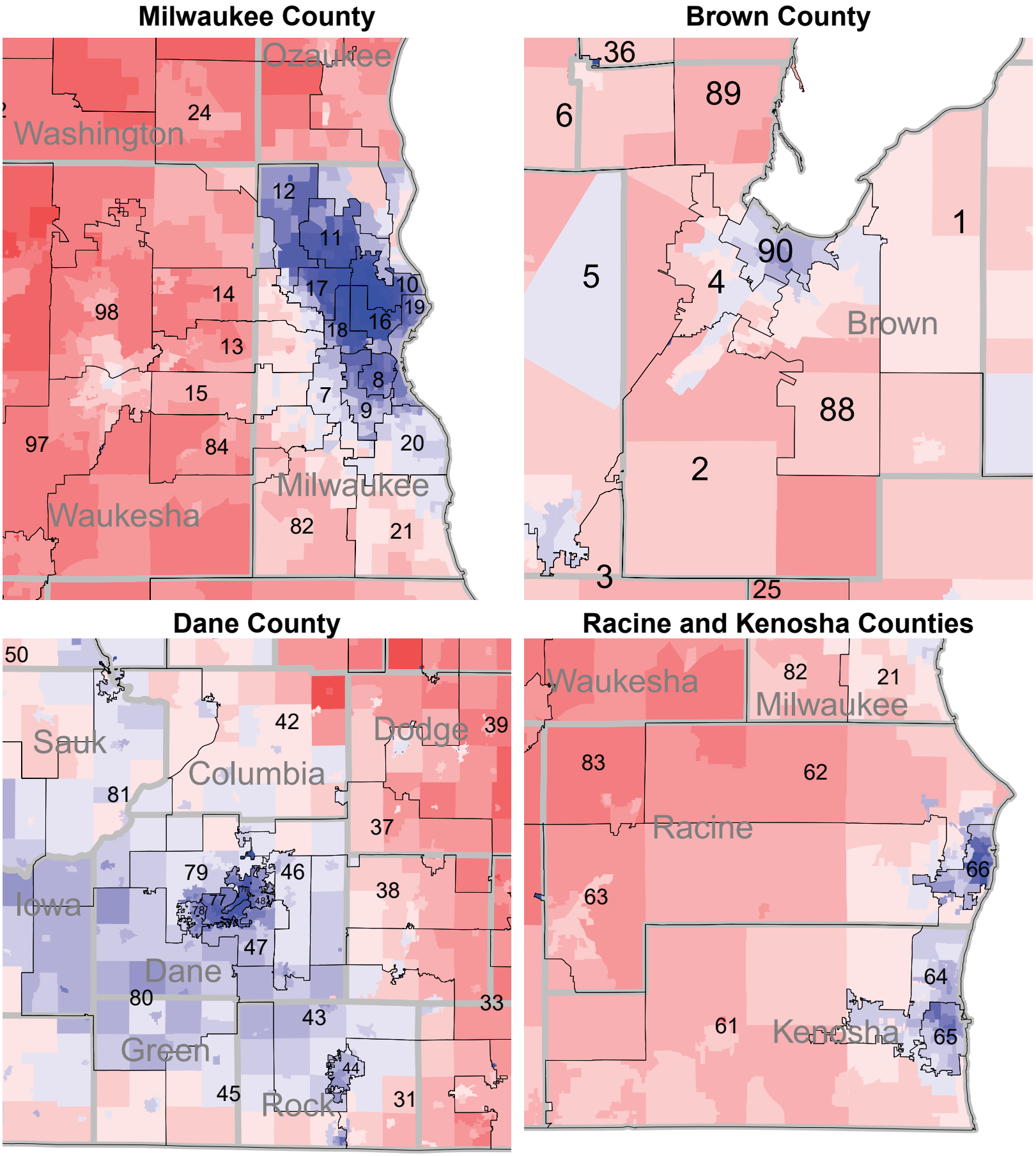


Figure 5a:
Ward−Level Republican Vote Share
(Chen Composite Measure)

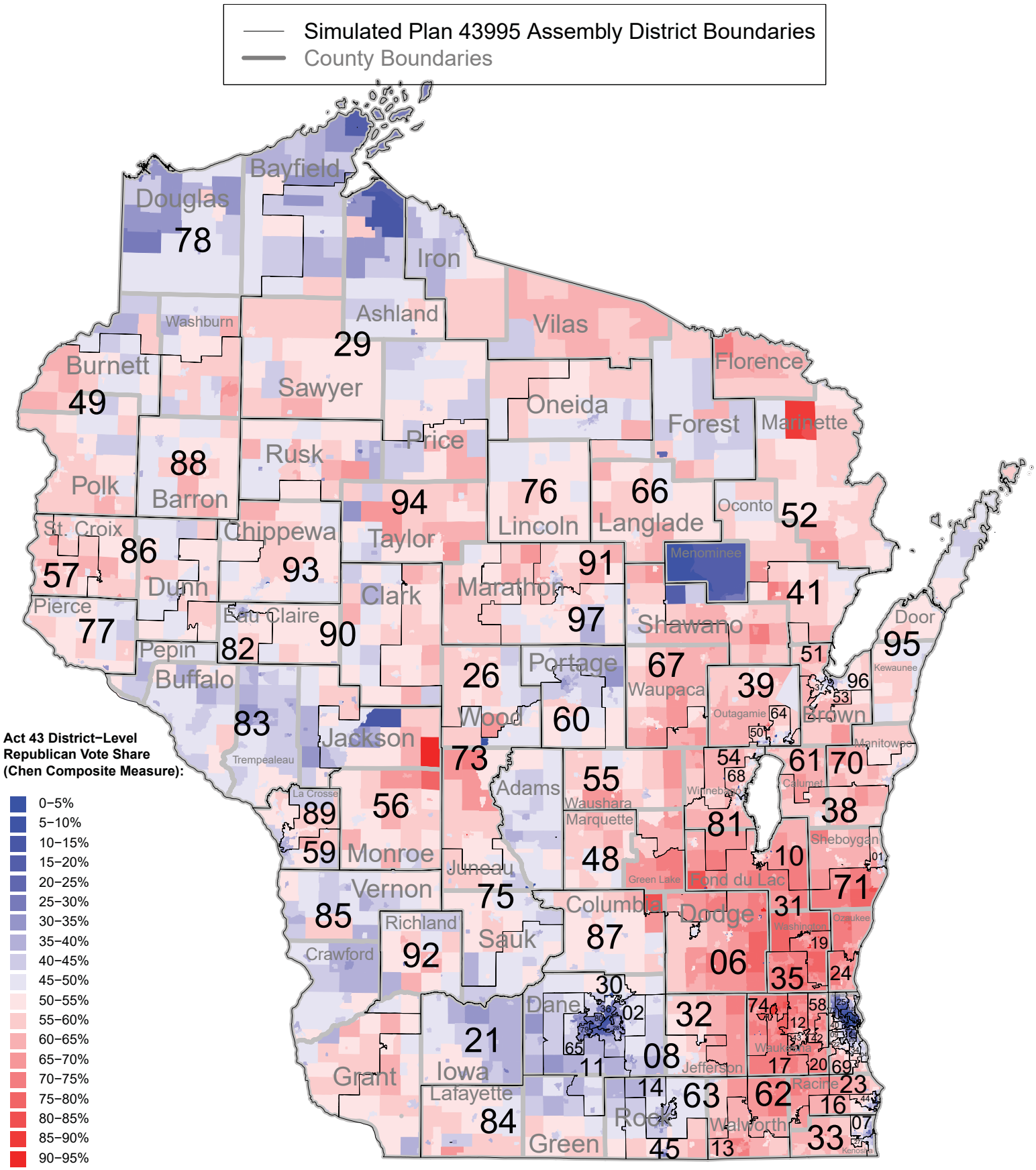


Figure 5b: Ward-Level Republican Vote Share (Chen Composite Measure) And Simulated Plan 43995 District Boundaries

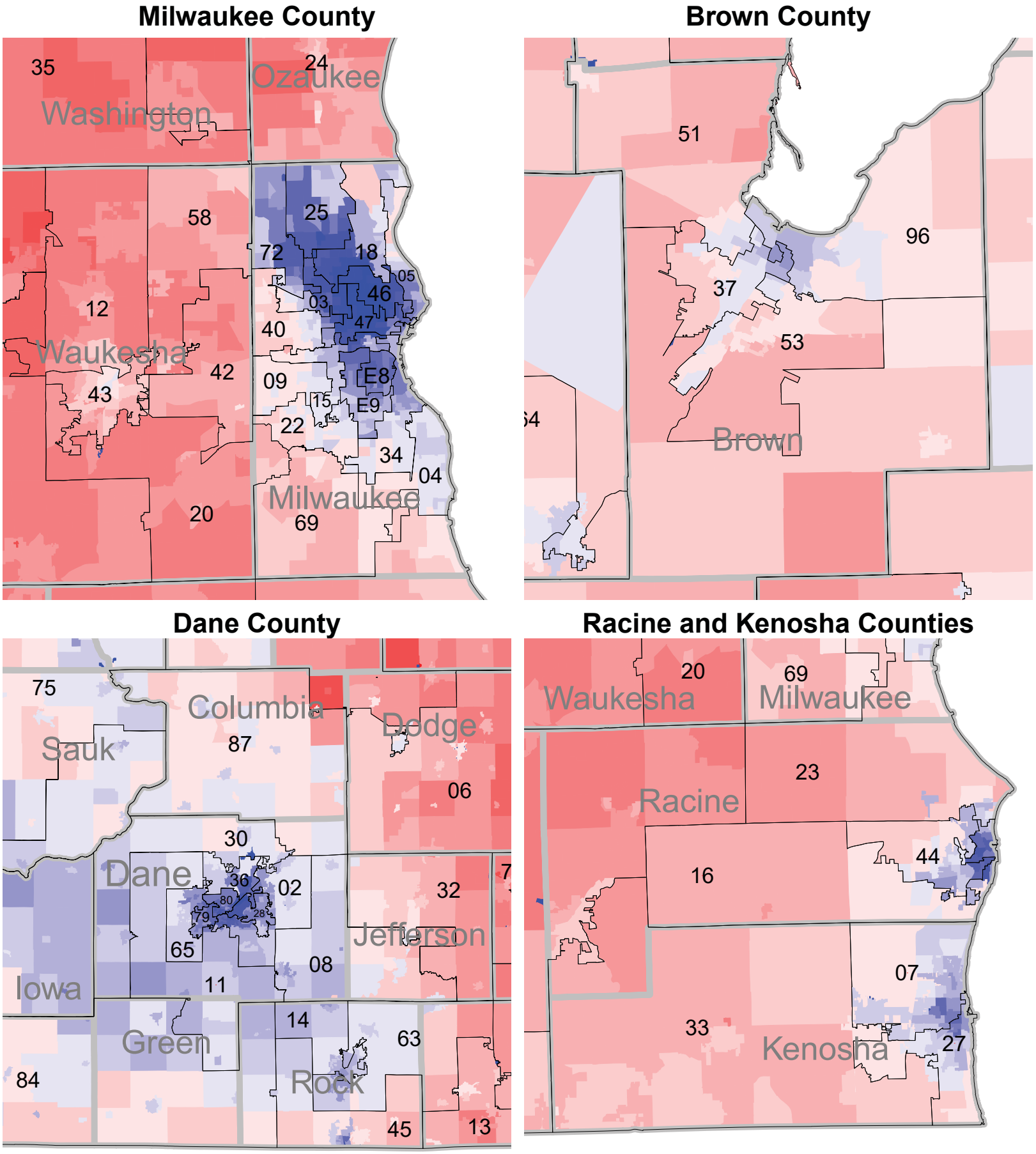
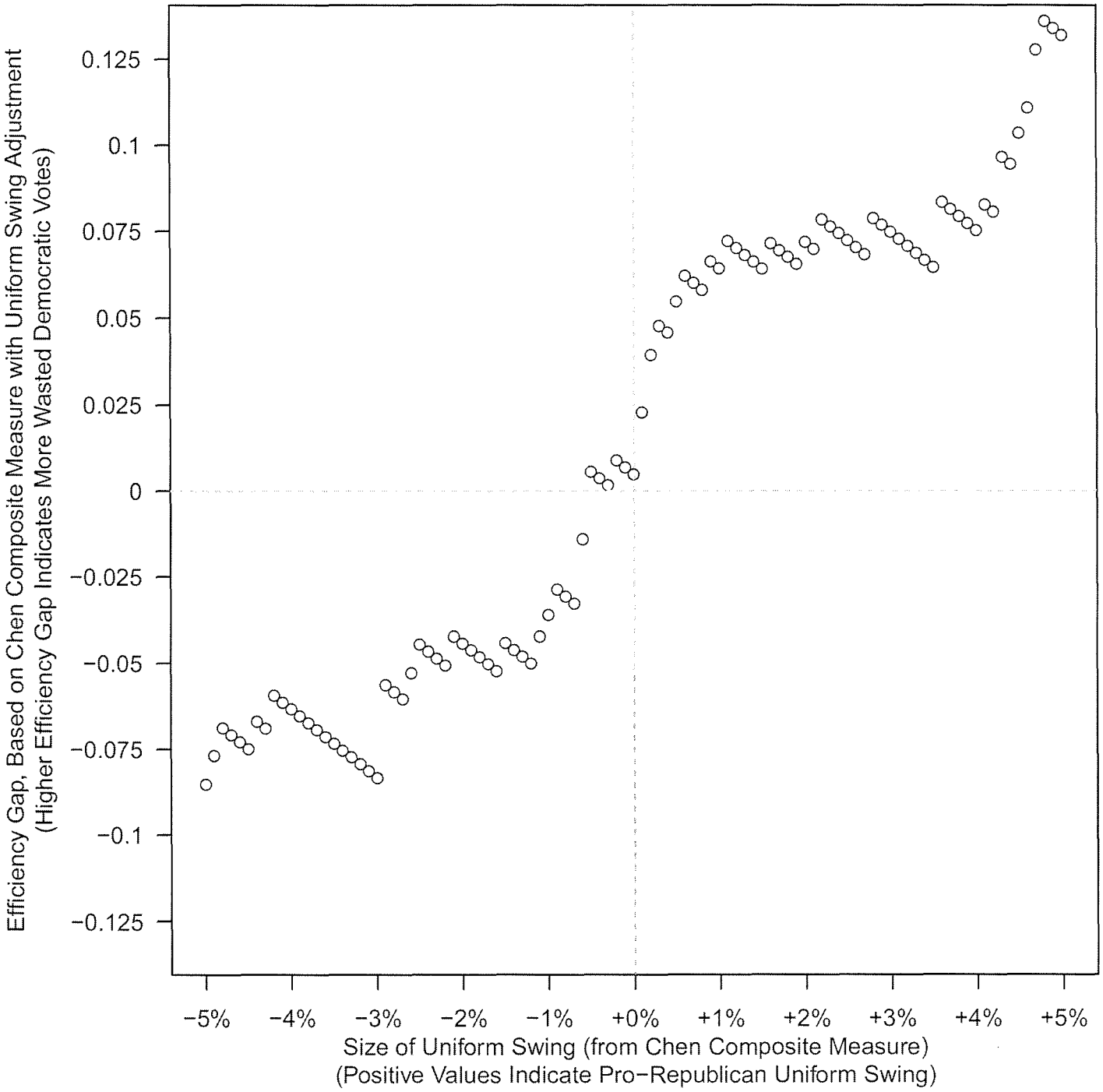
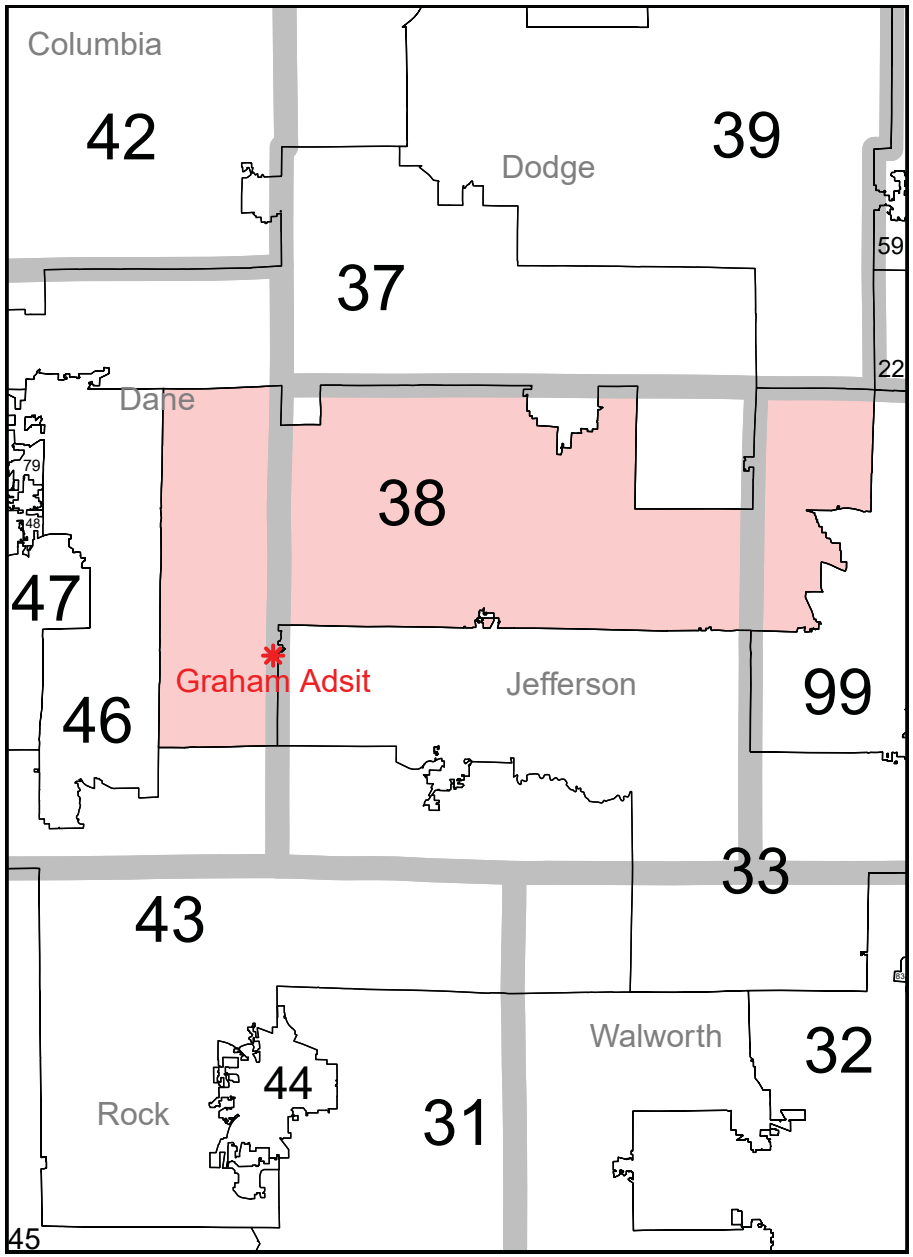


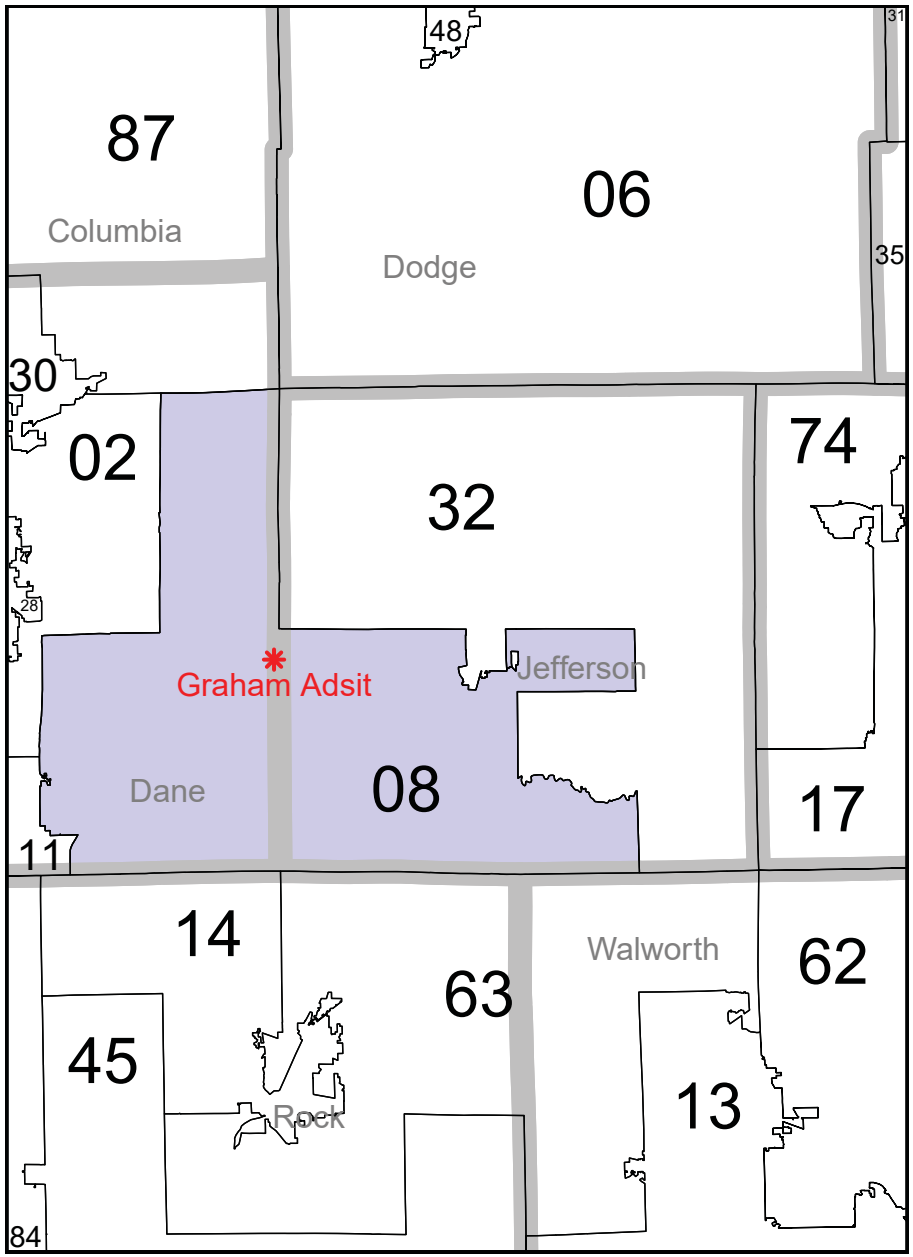
Figure 6:
Efficiency Gap of Simulated Plan 34995 with Different Uniform Swings



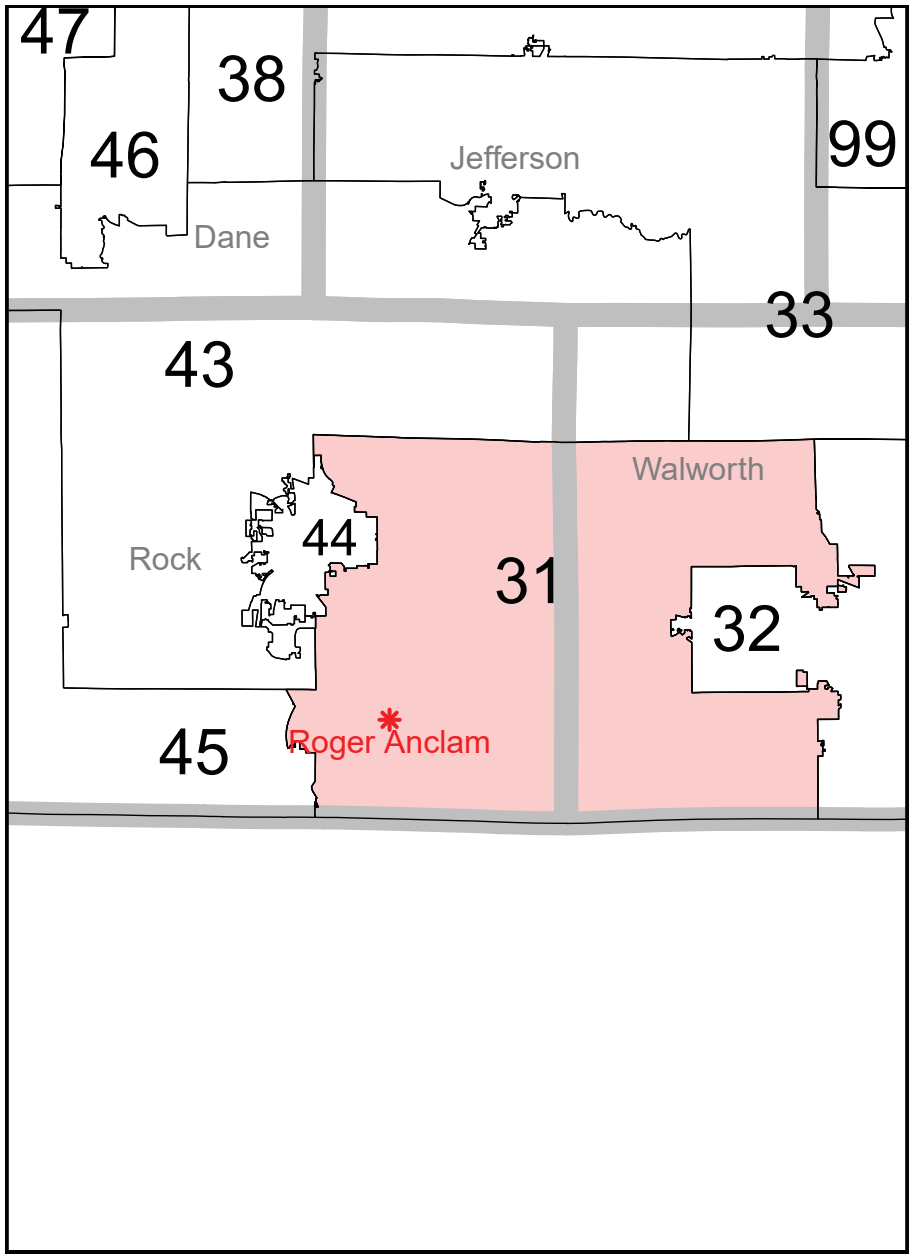
Plaintiff: Graham Adsit (Cambridge, WI)
District 38 of Act 43 Assembly Plan
(59.78% Republican Vote Share)



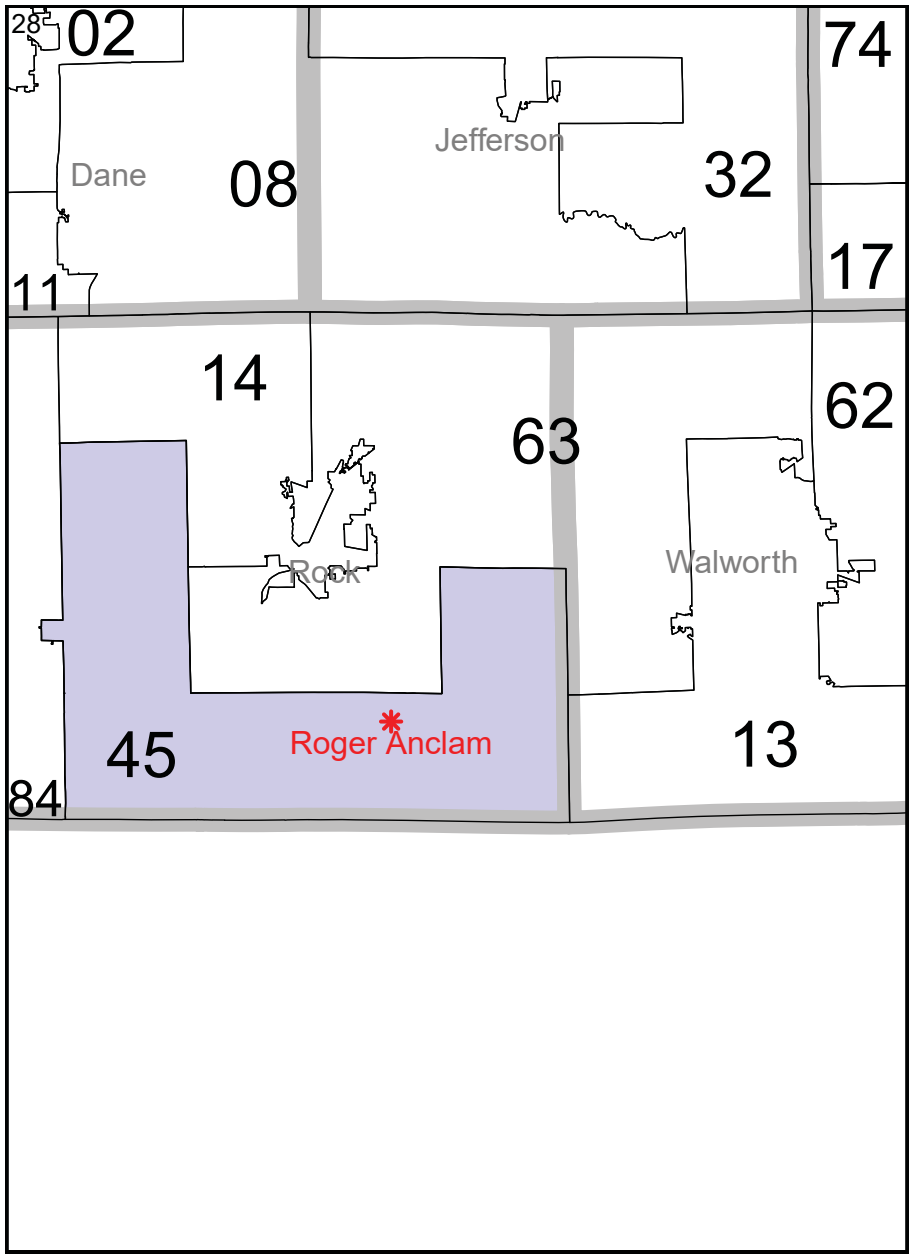
Plaintiff: Graham Adsit (Cambridge, WI)
District 8 of Simulated Plan 43995
(44.92% Republican Vote Share)



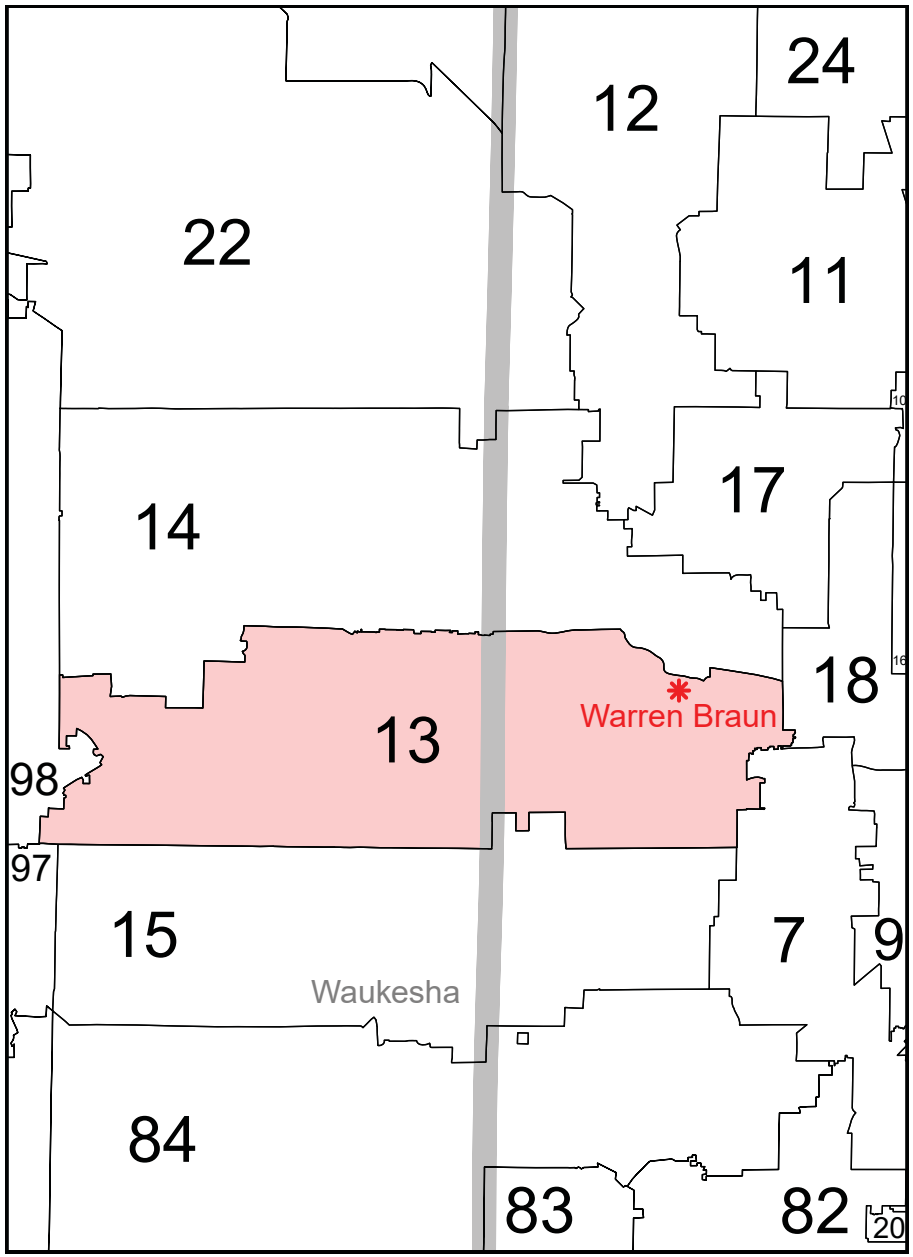
Plaintiff: Roger Anclam (Beloit, WI)
District 31 of Act 43 Assembly Plan
(56.1% Republican Vote Share)



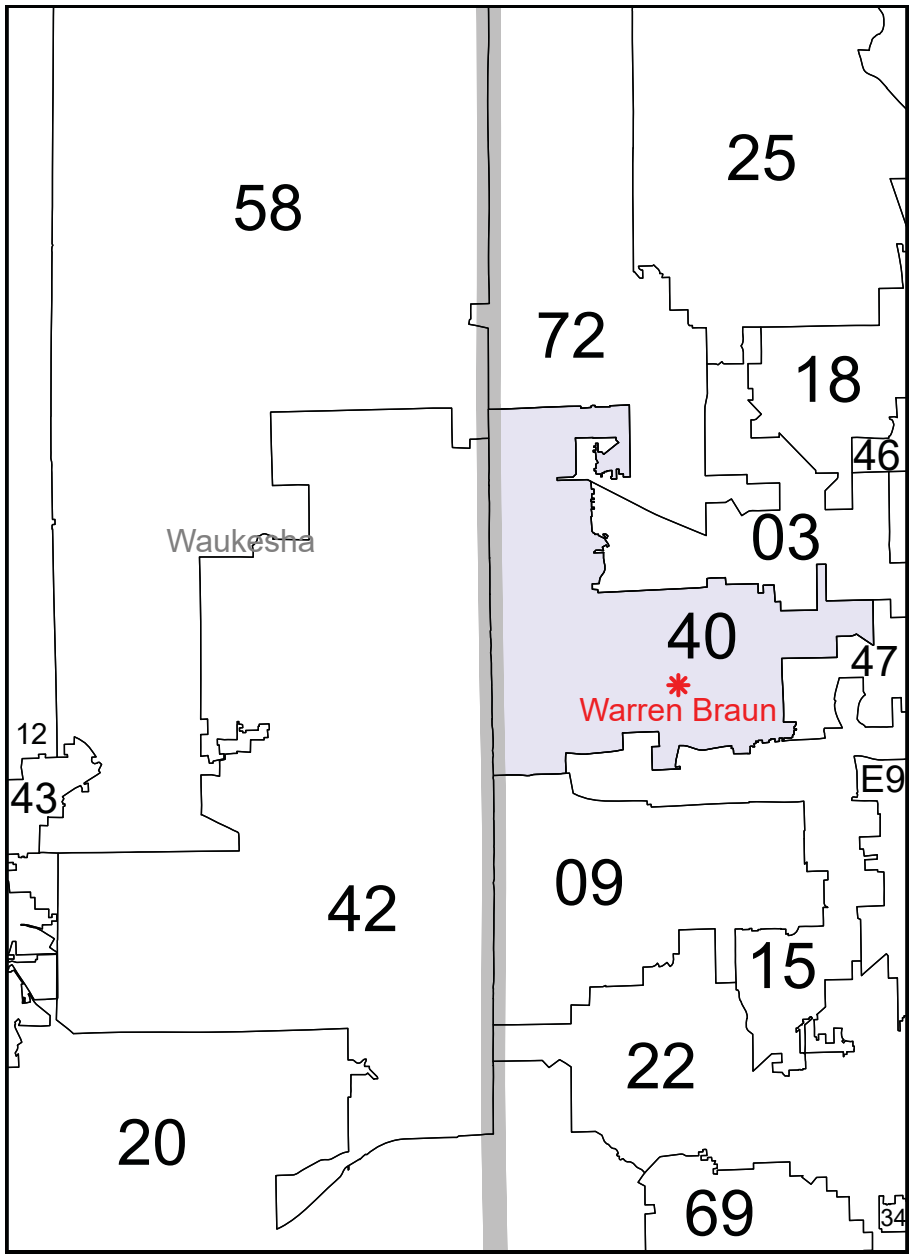
Plaintiff: Roger Anclam (Beloit, WI)
District 45 of Simulated Plan 43995
(43.25% Republican Vote Share)



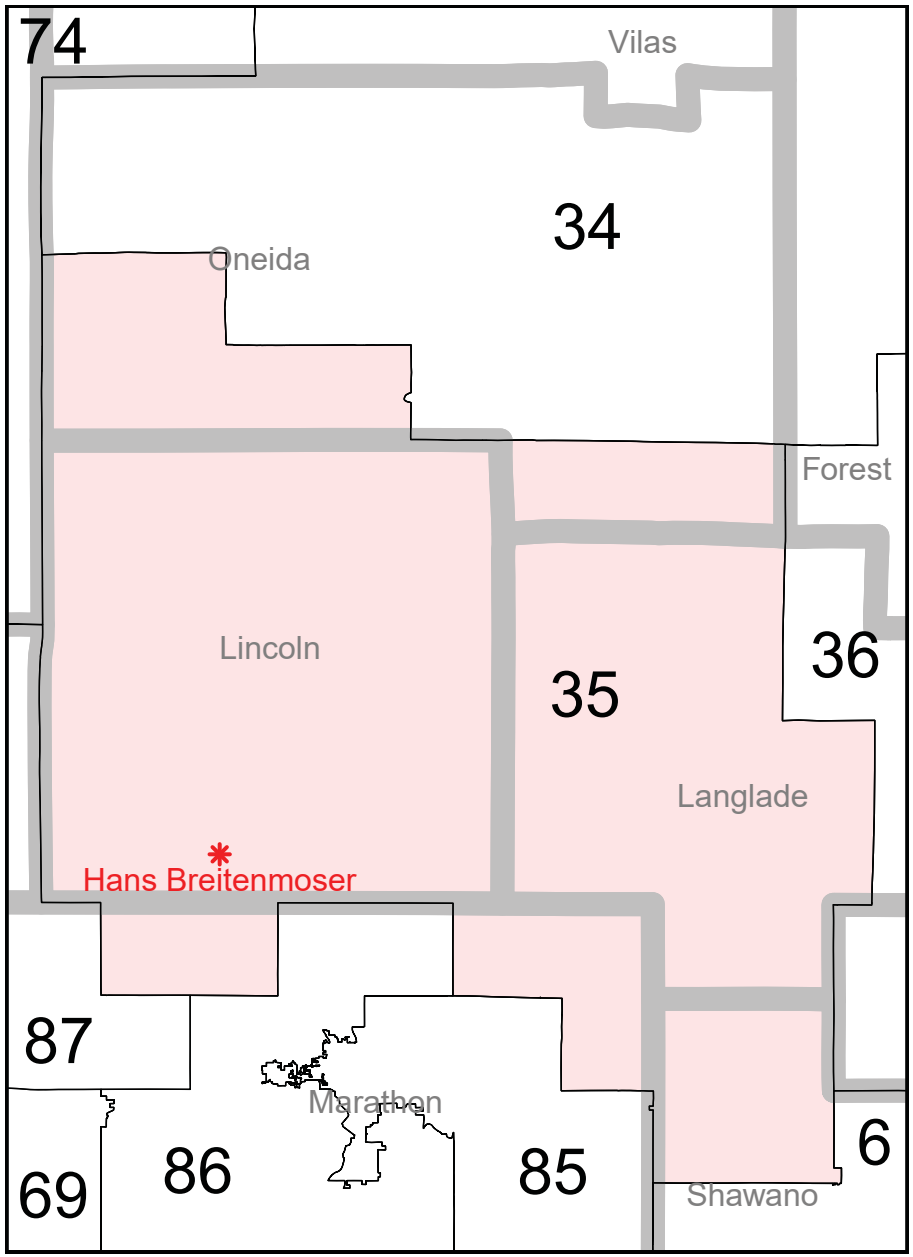
Plaintiff: Warren Braun (Wauwatosa, WI)
District 13 of Act 43 Assembly Plan
(59.67% Republican Vote Share)



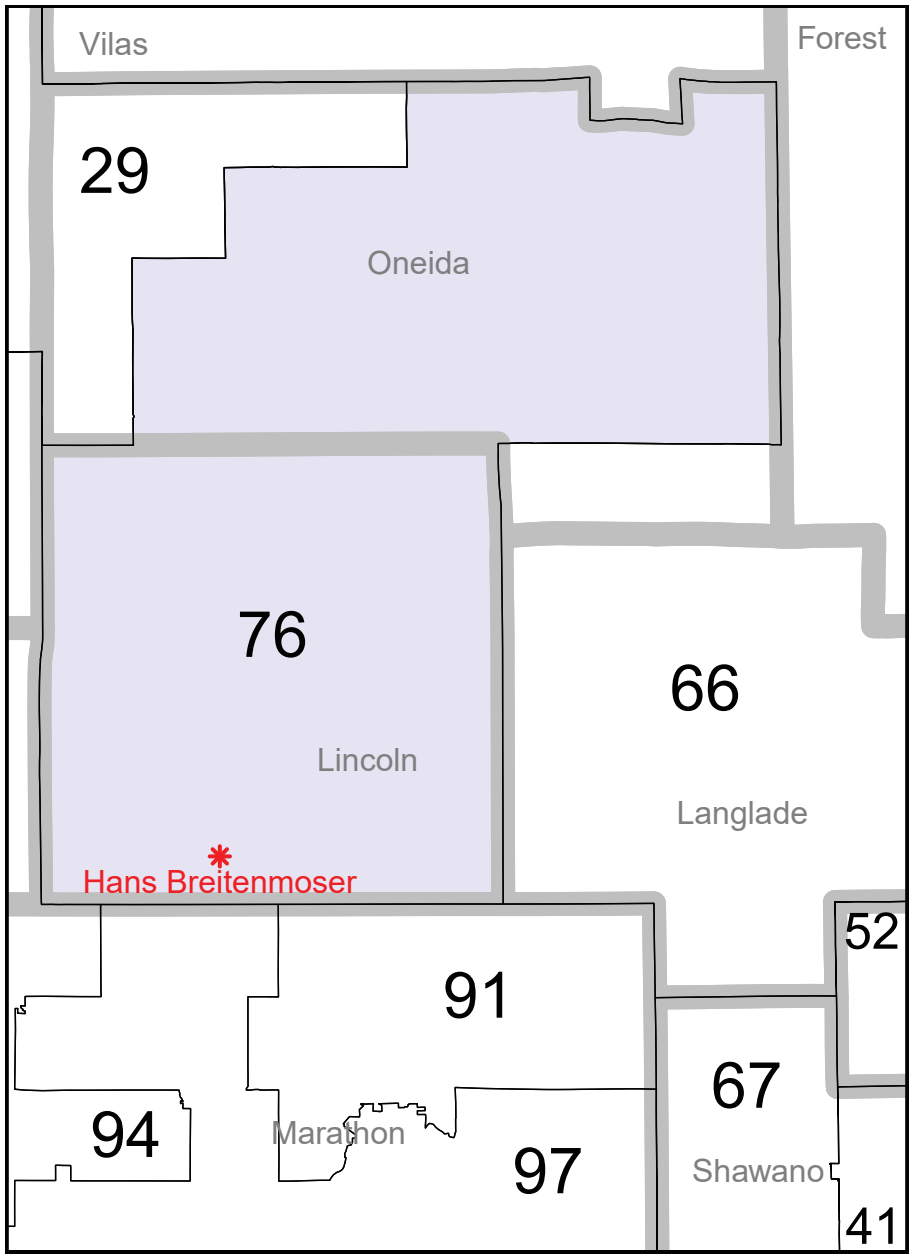
Plaintiff: Warren Braun (Wauwatosa, WI)
District 40 of Simulated Plan 43995
(47.3% Republican Vote Share)



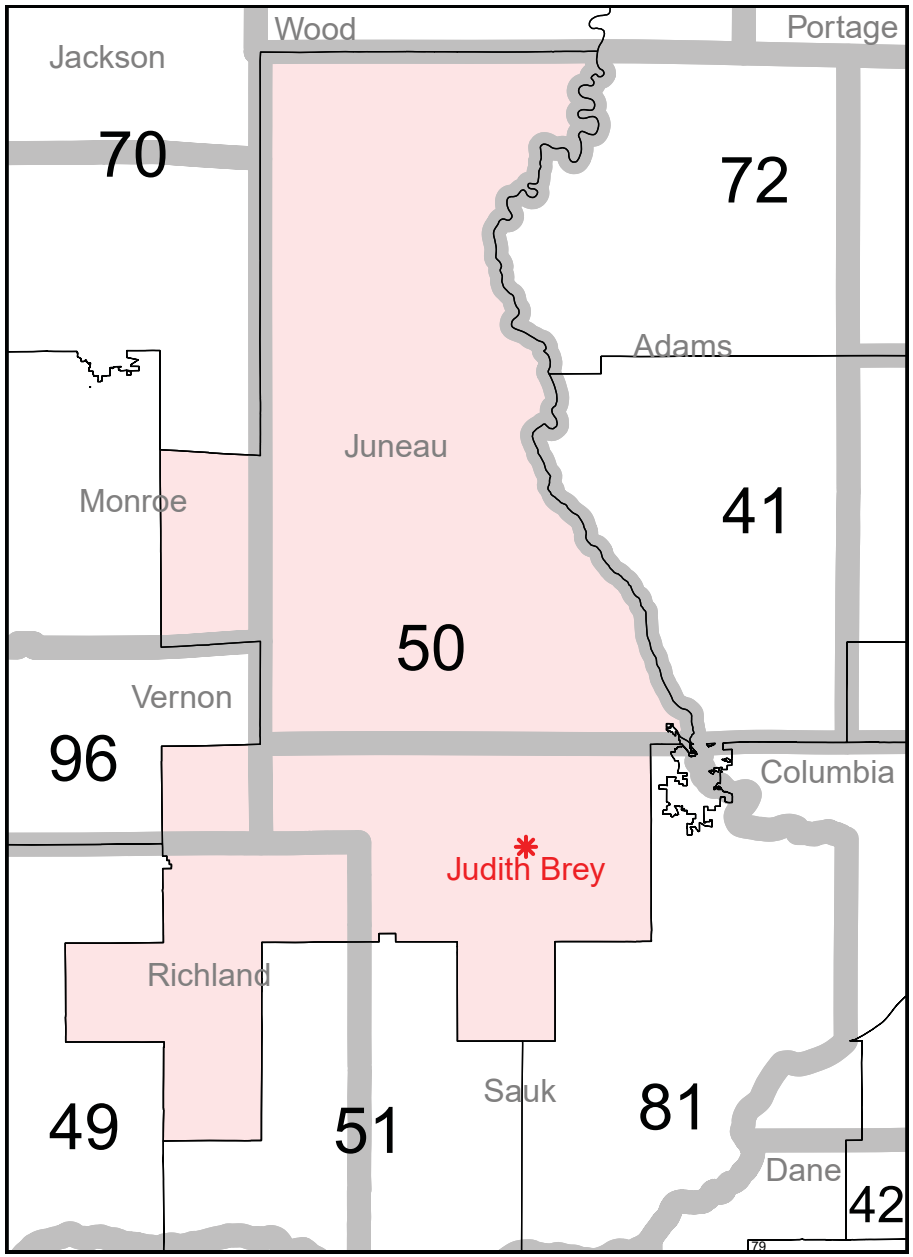
Plaintiff: Hans Breitenmoser (Merrill, WI)
District 35 of Act 43 Assembly Plan
(52.35% Republican Vote Share)



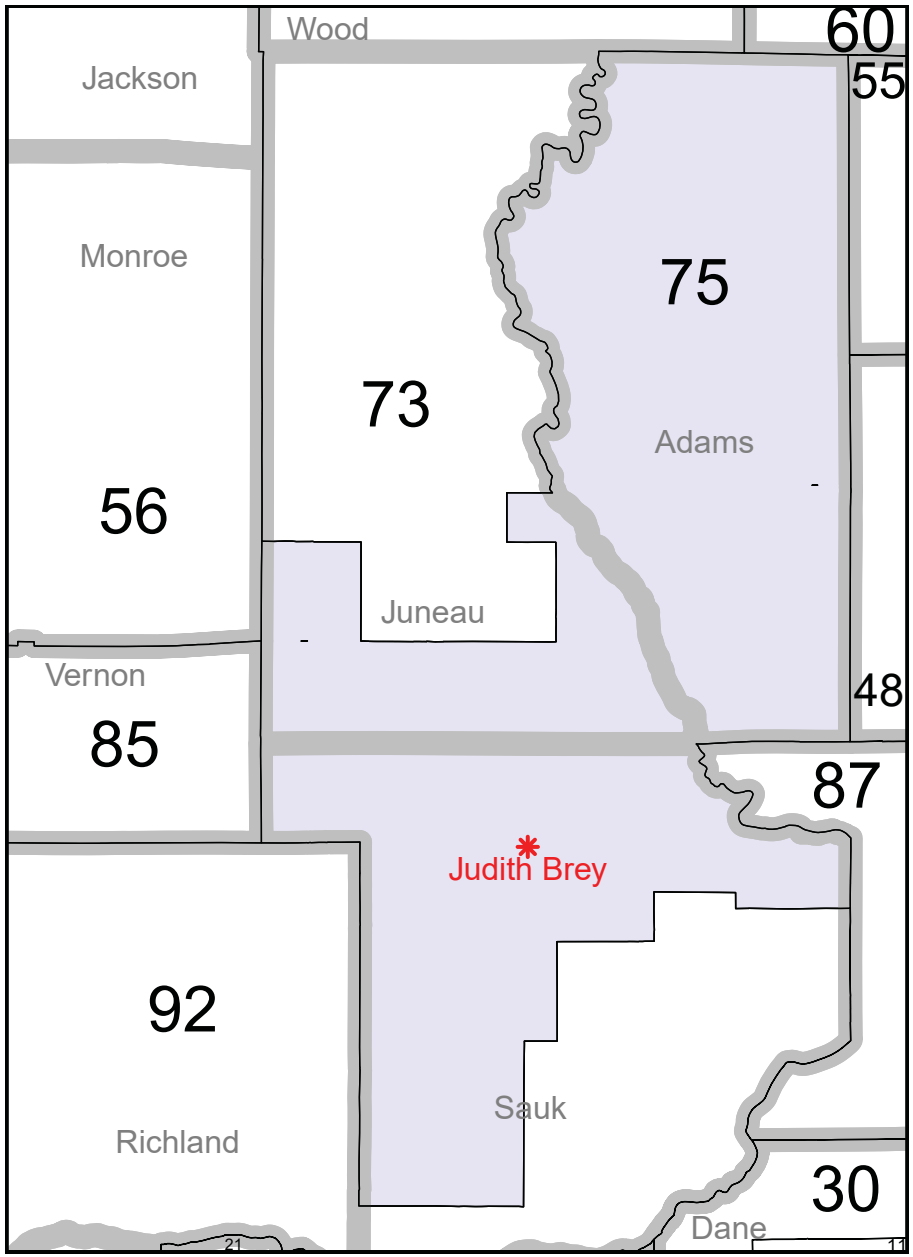
Plaintiff: Hans Breitenmoser (Merrill, WI)
District 76 of Simulated Plan 43995
(49.56% Republican Vote Share)



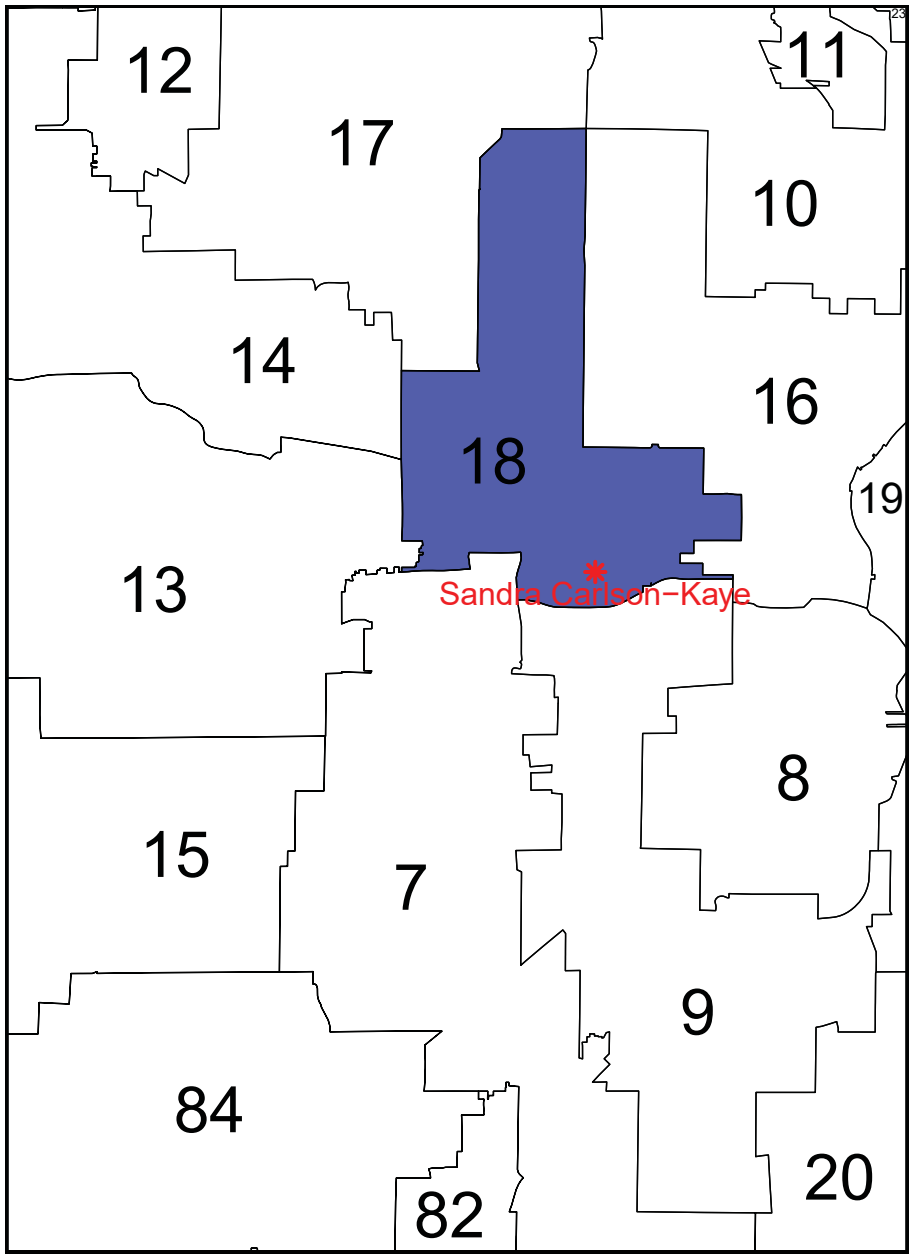
Plaintiff: Judith Brey (Reedsburg, WI)
District 50 of Act 43 Assembly Plan
(52.19% Republican Vote Share)



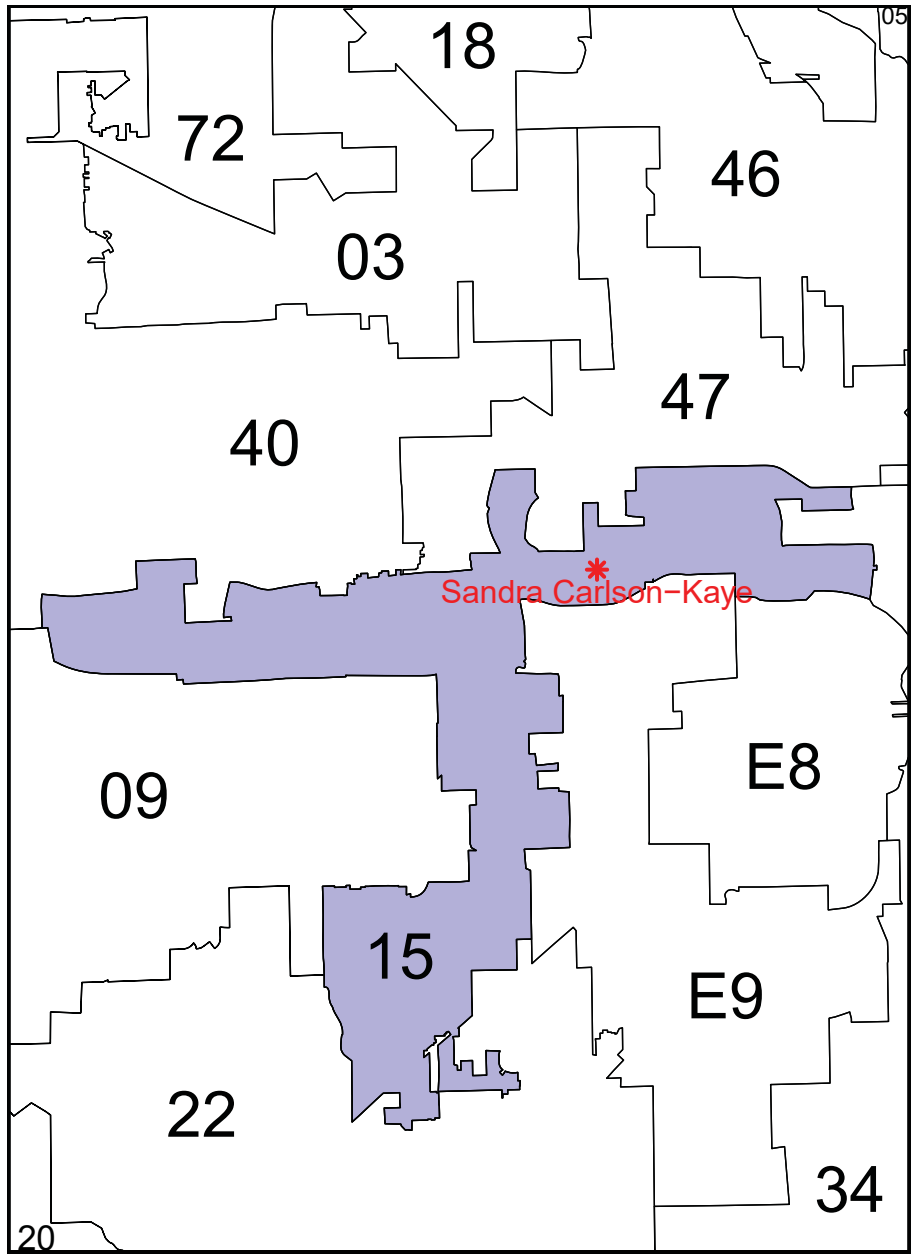
Plaintiff: Judith Brey (Reedsburg, WI)
District 75 of Simulated Plan 43995
(48.47% Republican Vote Share)



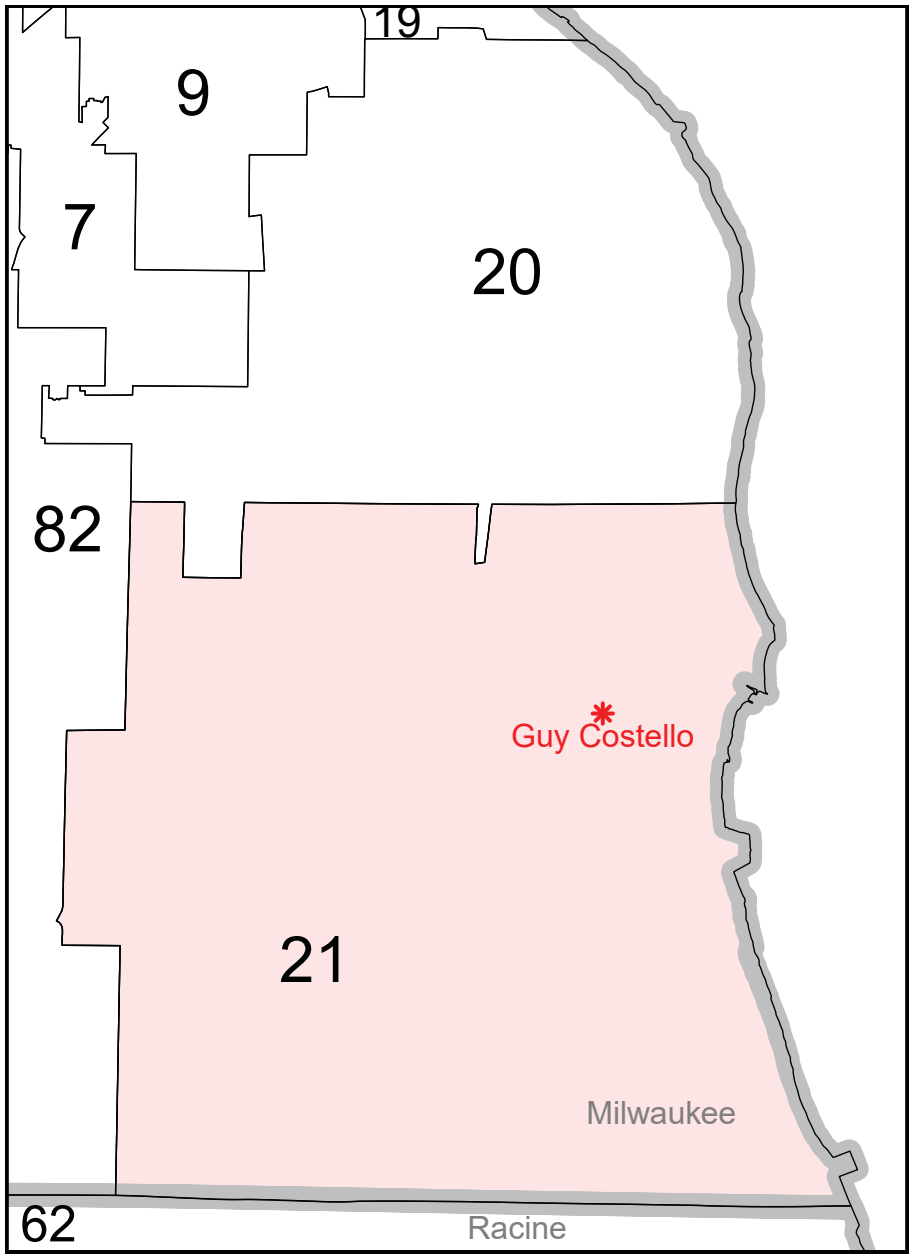
Plaintiff: Sandra Carlson-Kaye (Milwaukee, WI)
District 18 of Act 43 Assembly Plan
(16.66% Republican Vote Share)



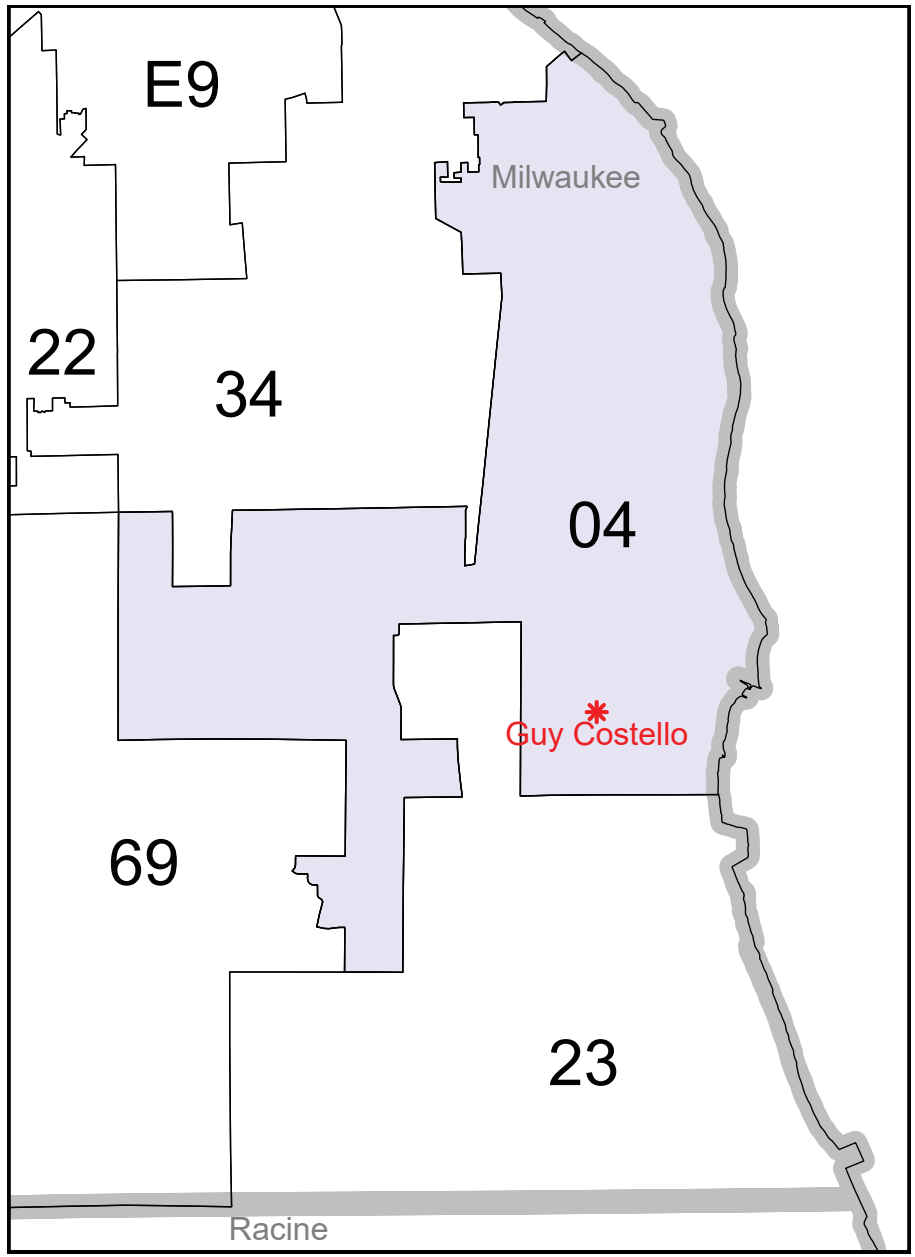
Plaintiff: Sandra Carlson-Kaye (Milwaukee, WI)
District 15 of Simulated Plan 43995
(39.96% Republican Vote Share)



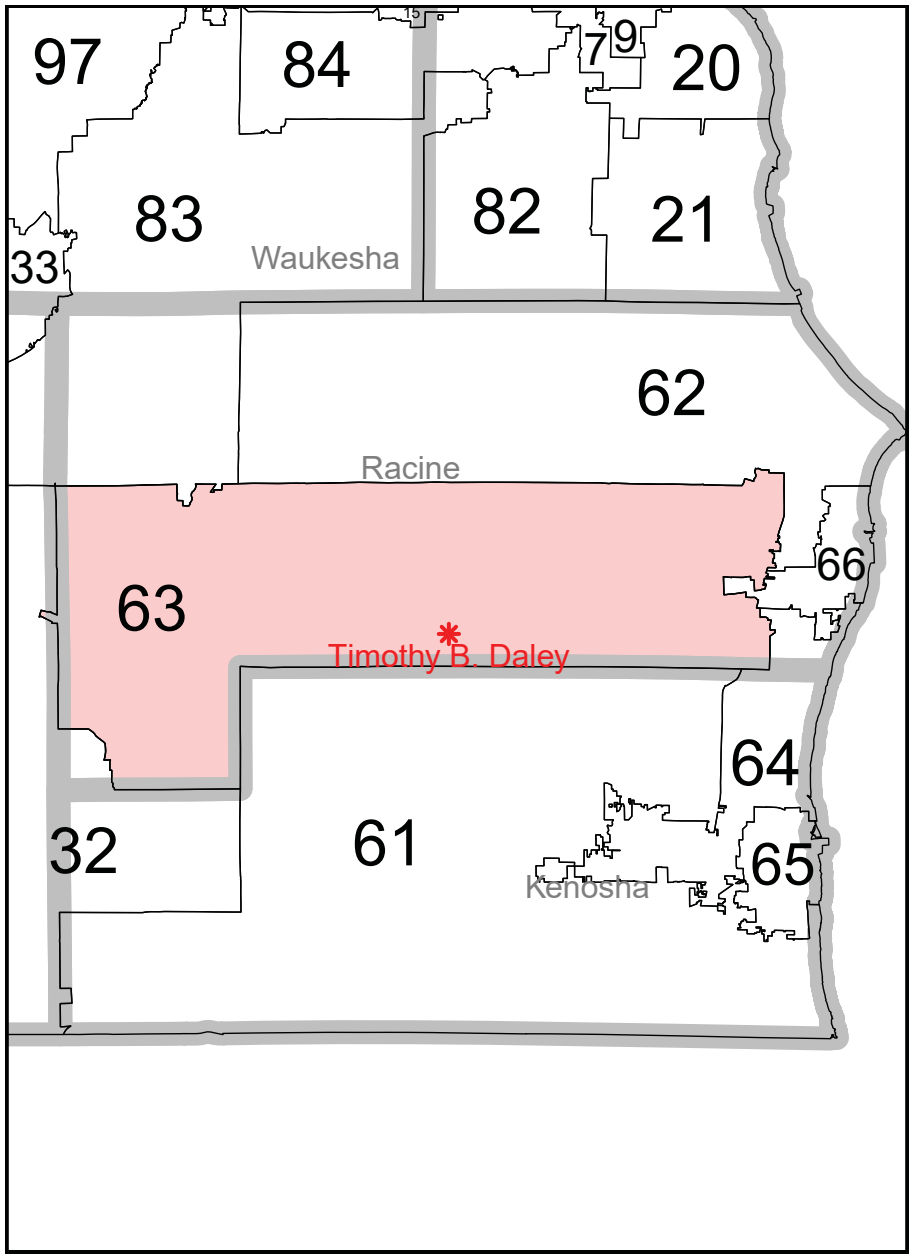
Plaintiff: Guy Costello (South Milwaukee, WI)
District 21 of Act 43 Assembly Plan
(52.96% Republican Vote Share)



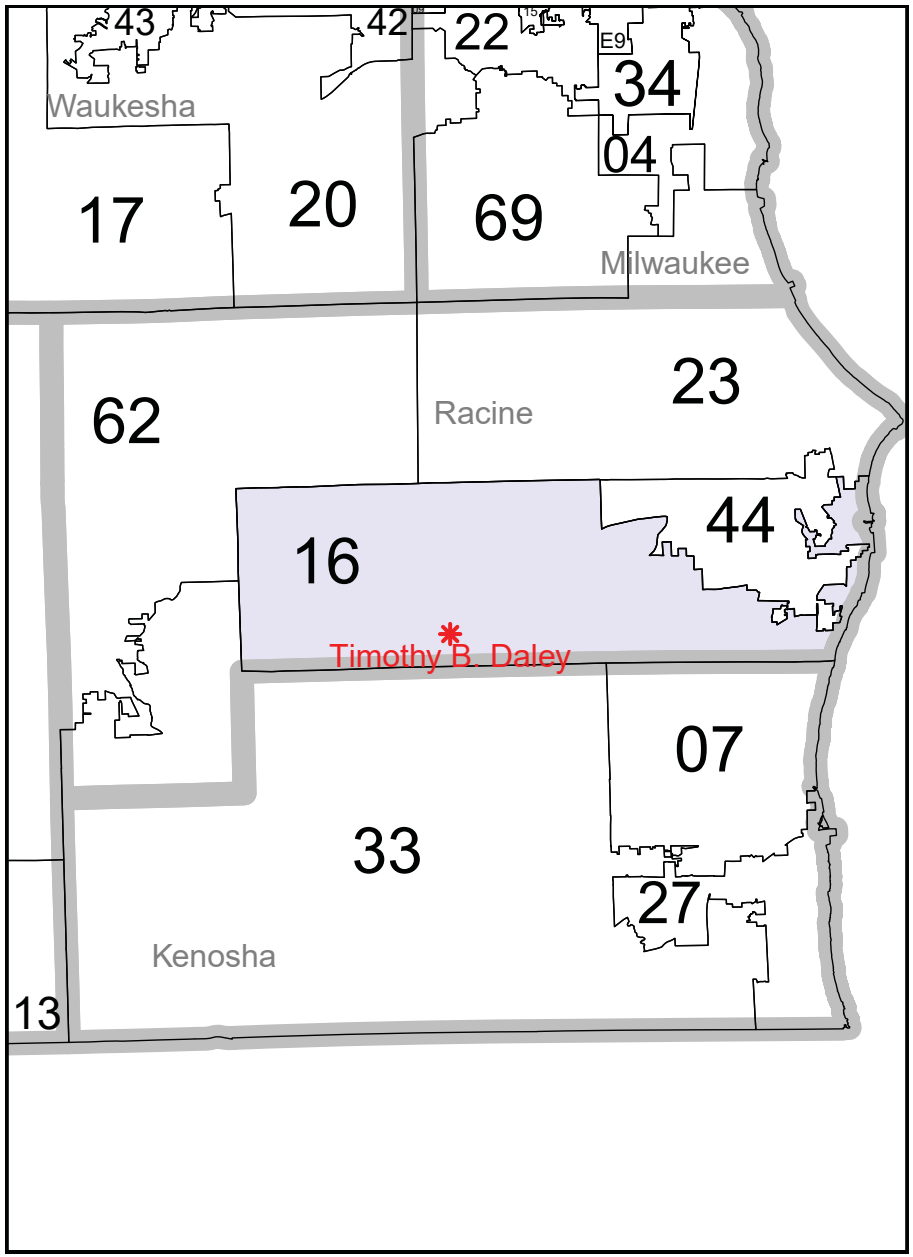
Plaintiff: Guy Costello (South Milwaukee, WI)
District 4 of Simulated Plan 43995
(47.81% Republican Vote Share)



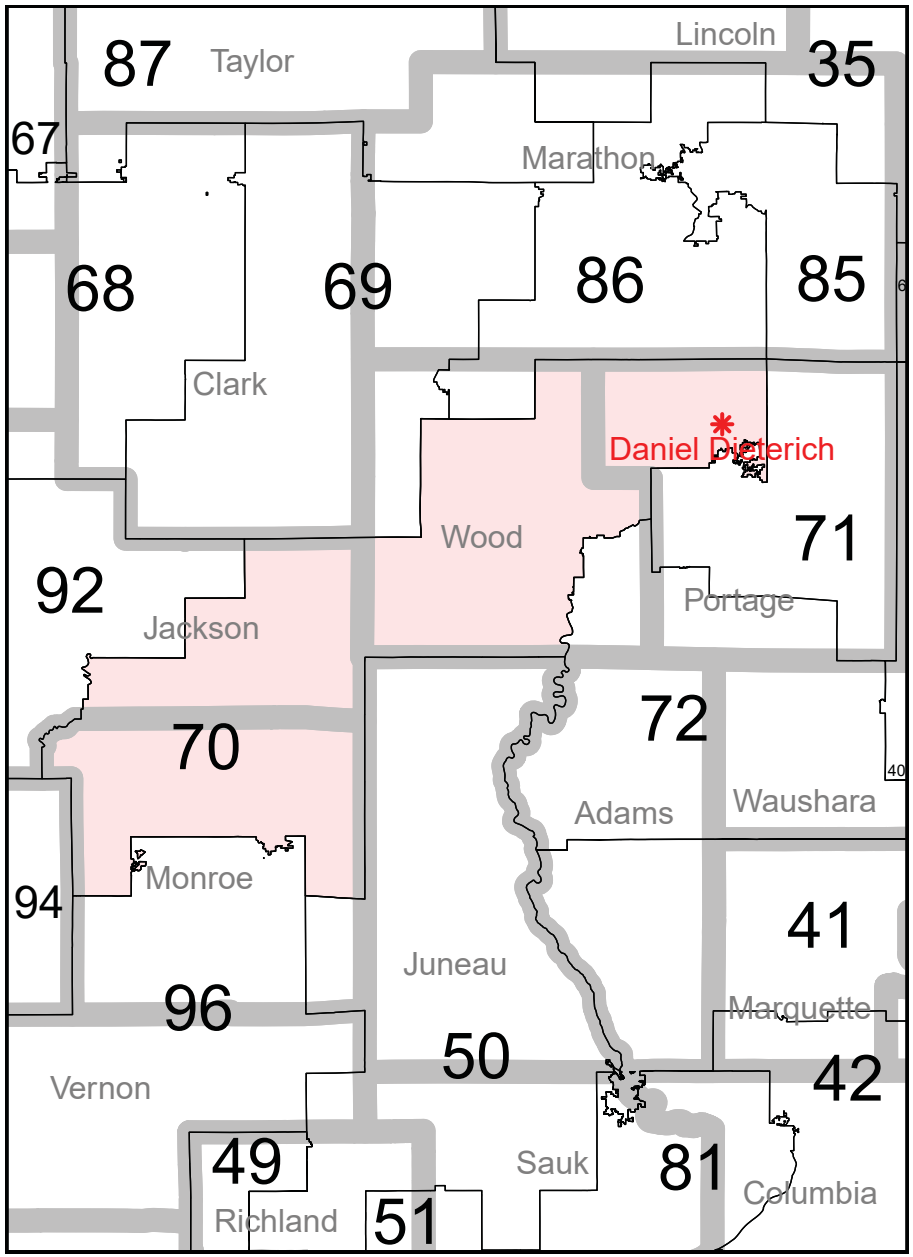
Plaintiff: Timothy B. Daley (Union Grove, WI)
District 63 of Act 43 Assembly Plan
(58.33% Republican Vote Share)



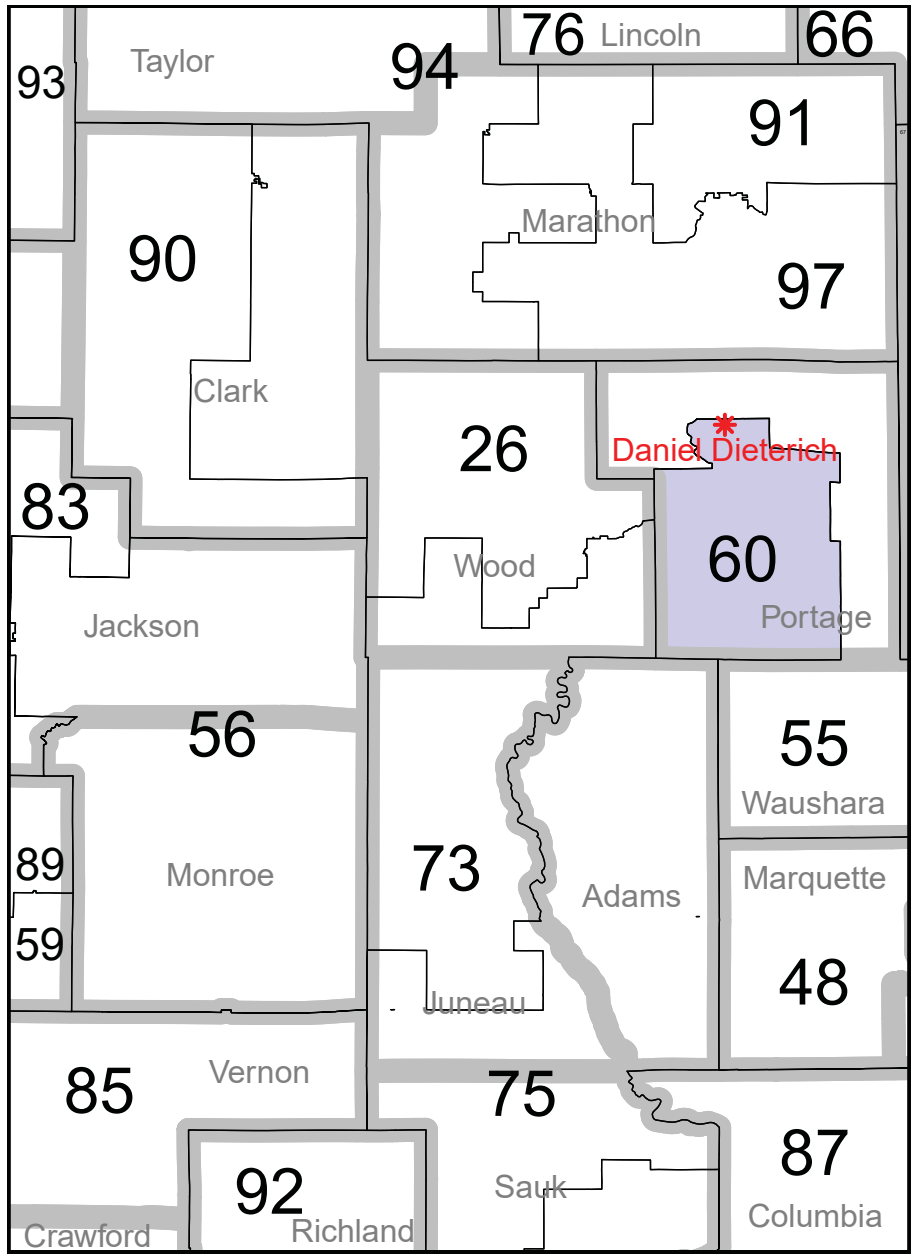
Plaintiff: Timothy B. Daley (Union Grove, WI)
District 16 of Simulated Plan 43995
(45.74% Republican Vote Share)



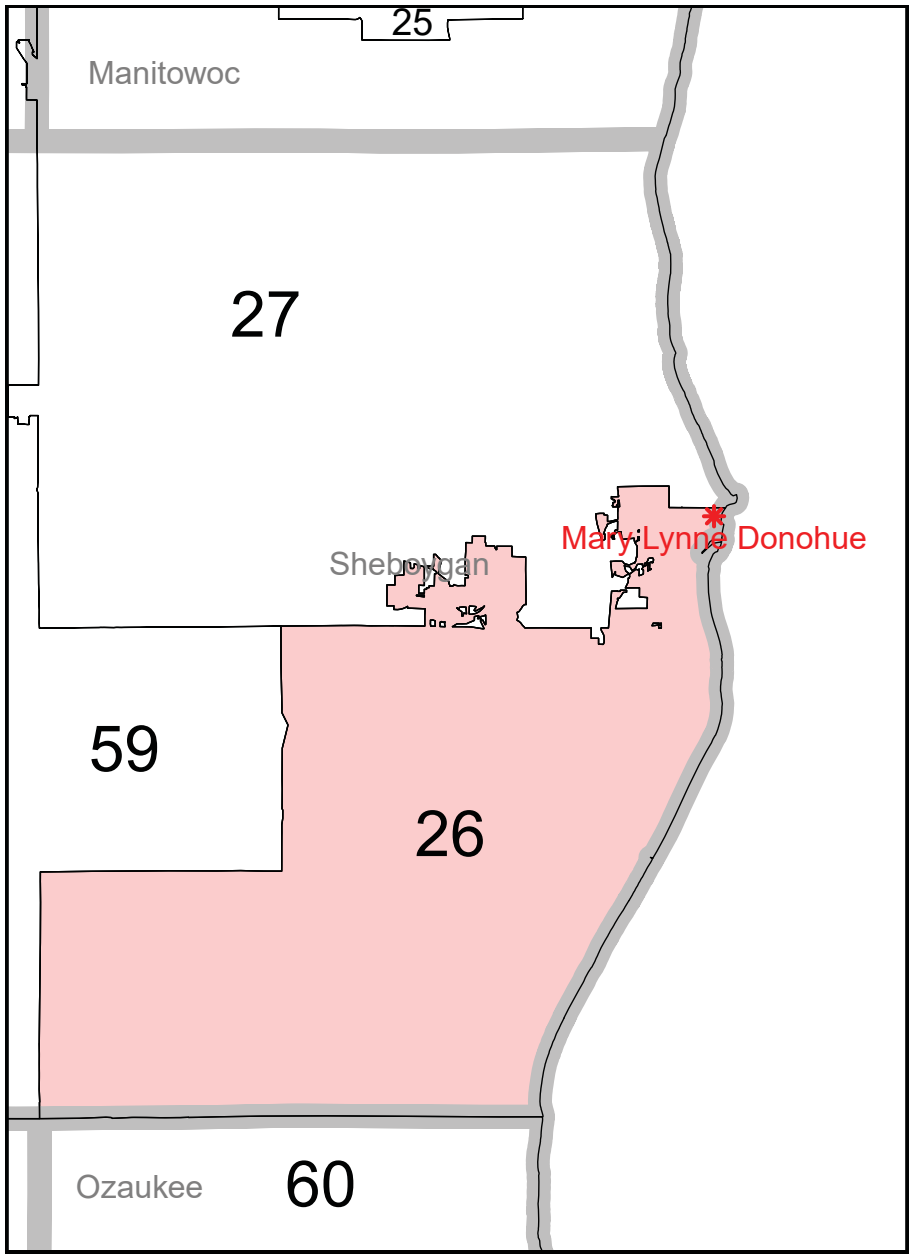
Plaintiff: Daniel Dieterich (Stevens Point, WI)
District 70 of Act 43 Assembly Plan
(50.43% Republican Vote Share)



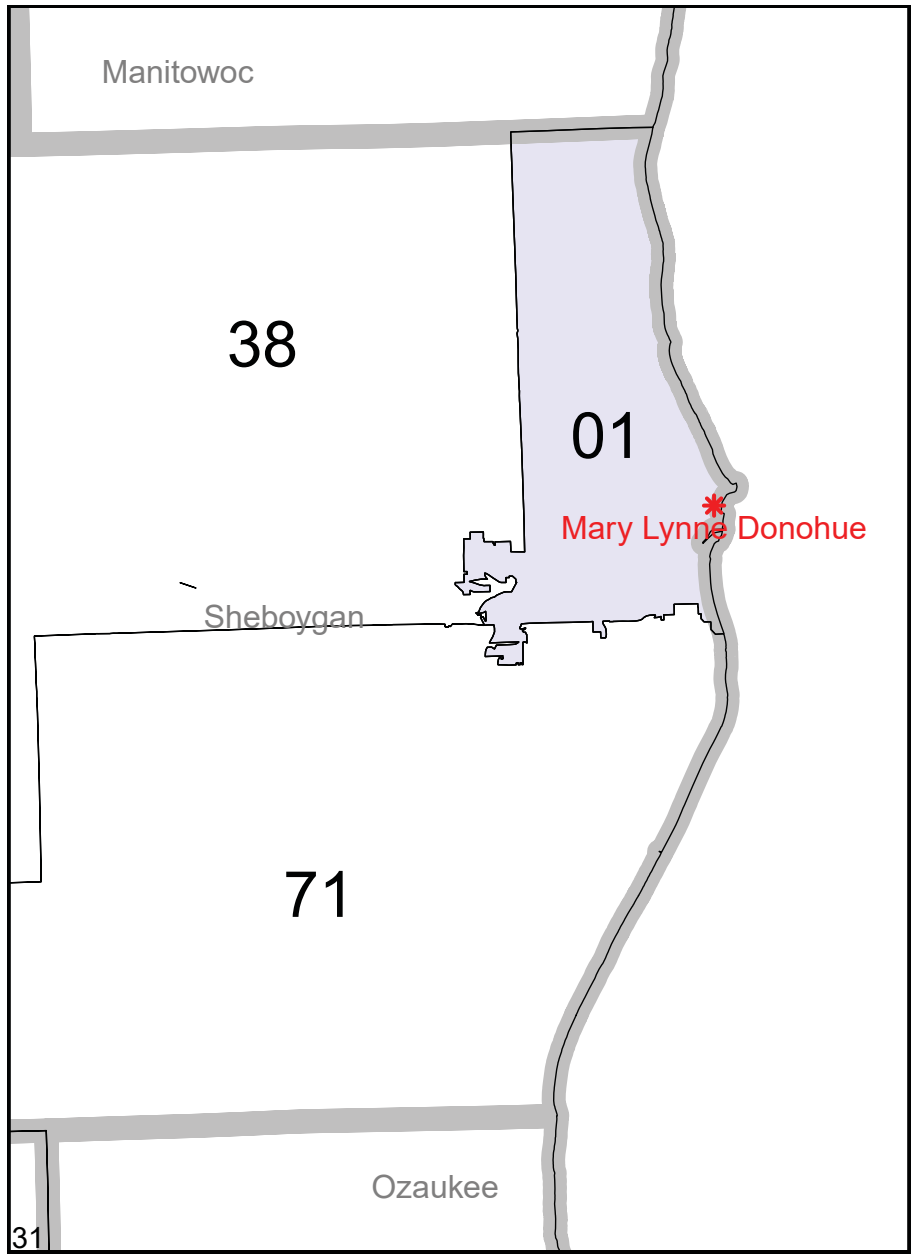
Plaintiff: Daniel Dieterich (Stevens Point, WI)
District 60 of Simulated Plan 43995
(41.68% Republican Vote Share)



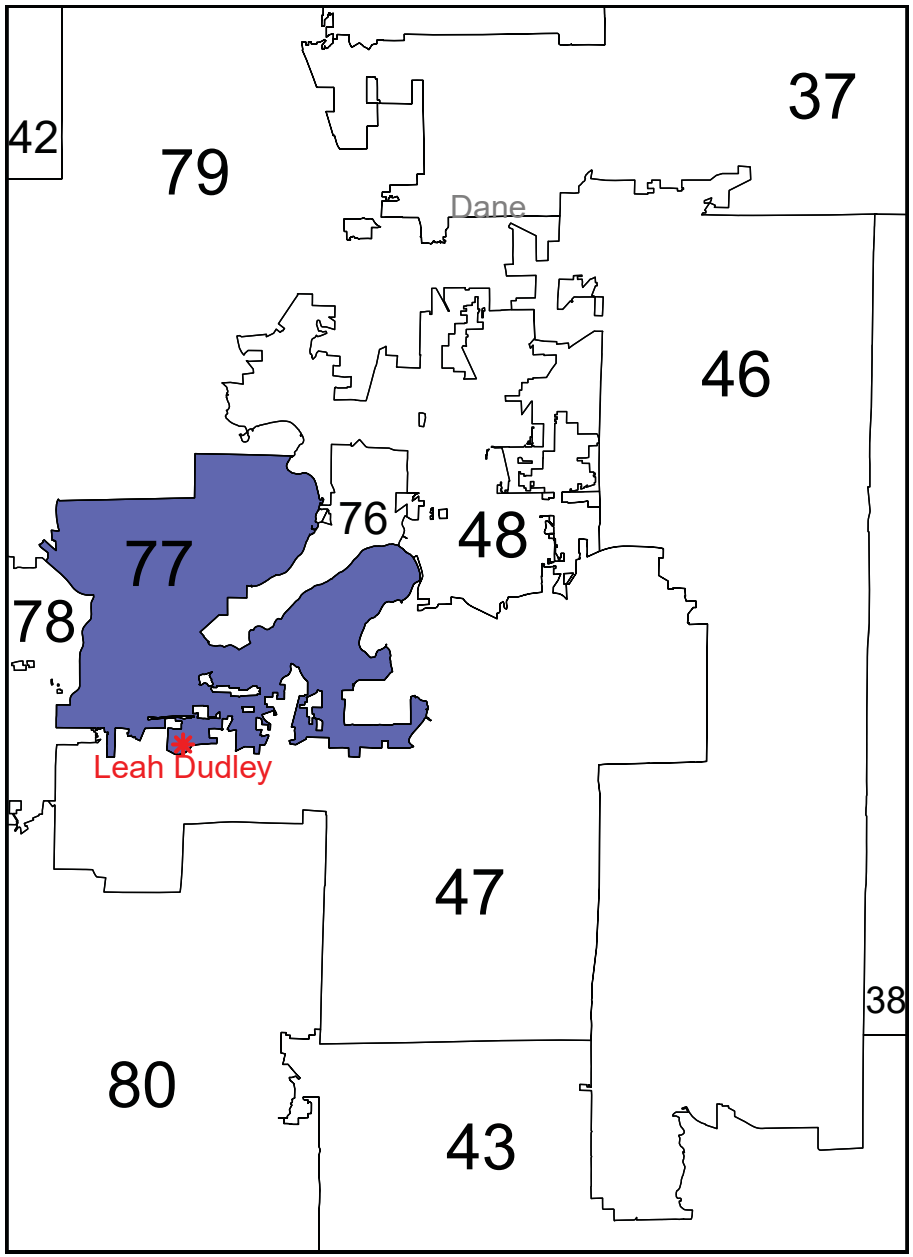
Plaintiff: Mary Lynne Donohue (Sheboygan, WI)
District 26 of Act 43 Assembly Plan
(56.34% Republican Vote Share)



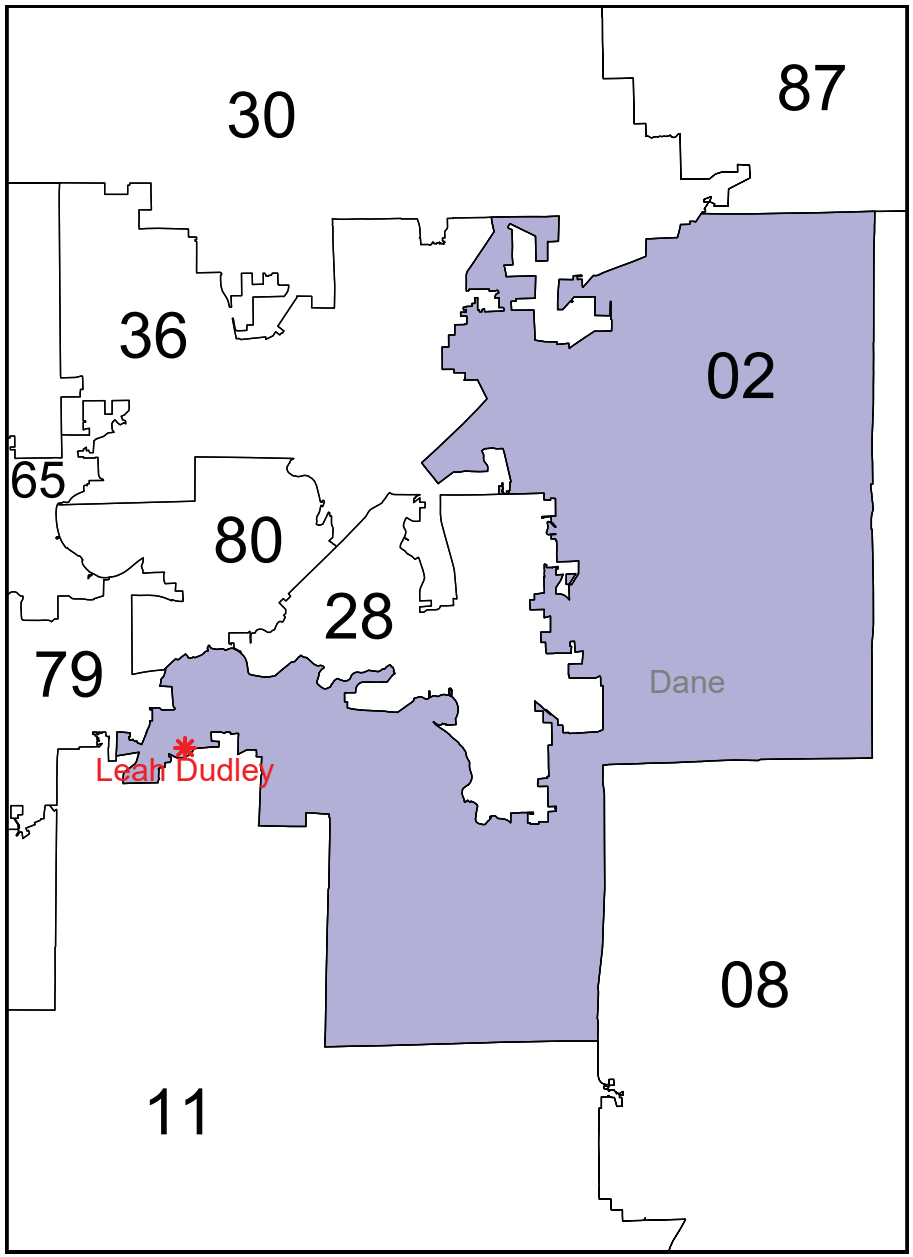
Plaintiff: Mary Lynne Donohue (Sheboygan, WI)
District 1 of Simulated Plan 43995
(48.94% Republican Vote Share)



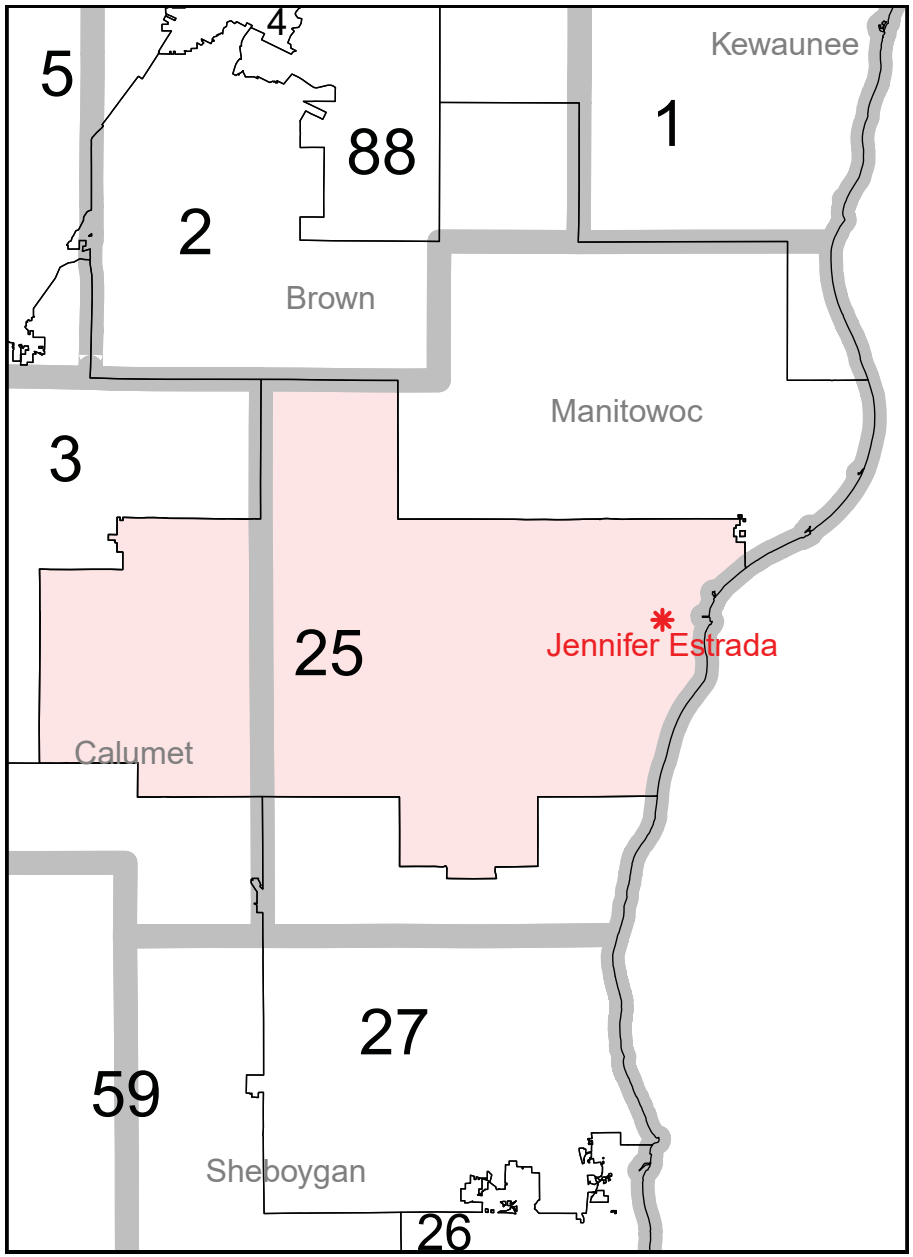
Plaintiff: Leah Dudley (Madison, WI)
District 77 of Act 43 Assembly Plan
(21% Republican Vote Share)



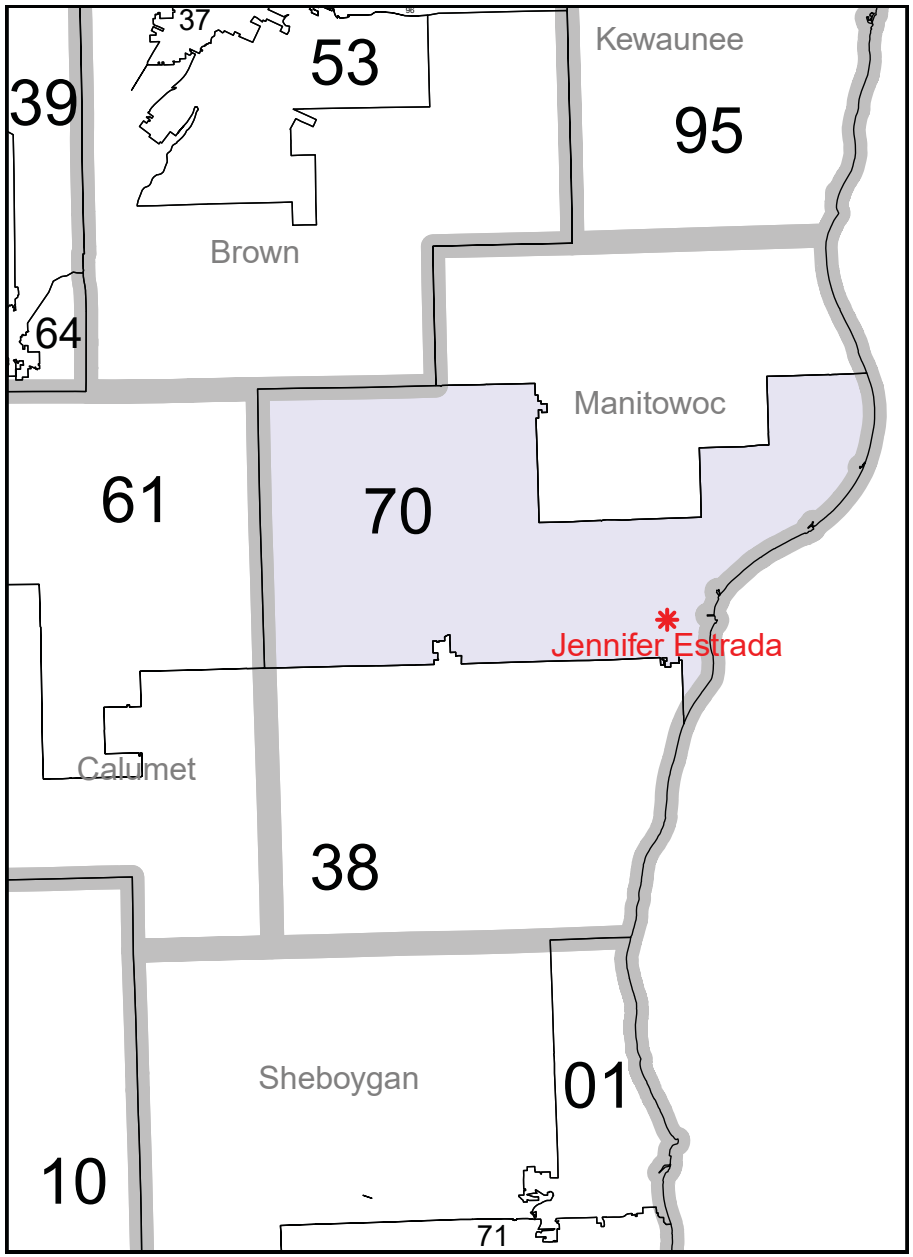
Plaintiff: Leah Dudley (Madison, WI)
District 2 of Simulated Plan 43995
(36.13% Republican Vote Share)



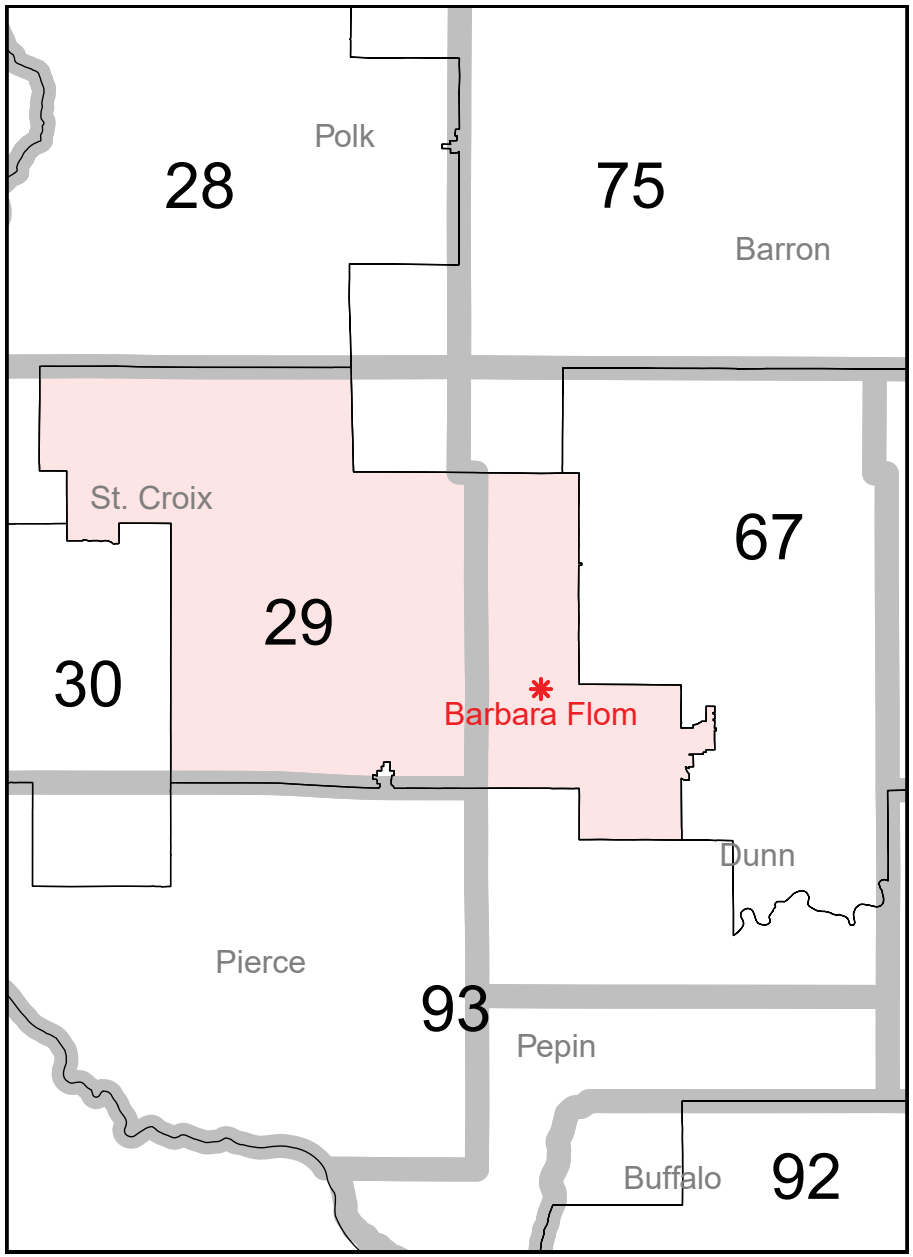
Plaintiff: Jennifer Estrada (Manitowoc, WI)
District 25 of Act 43 Assembly Plan
(53.1% Republican Vote Share)



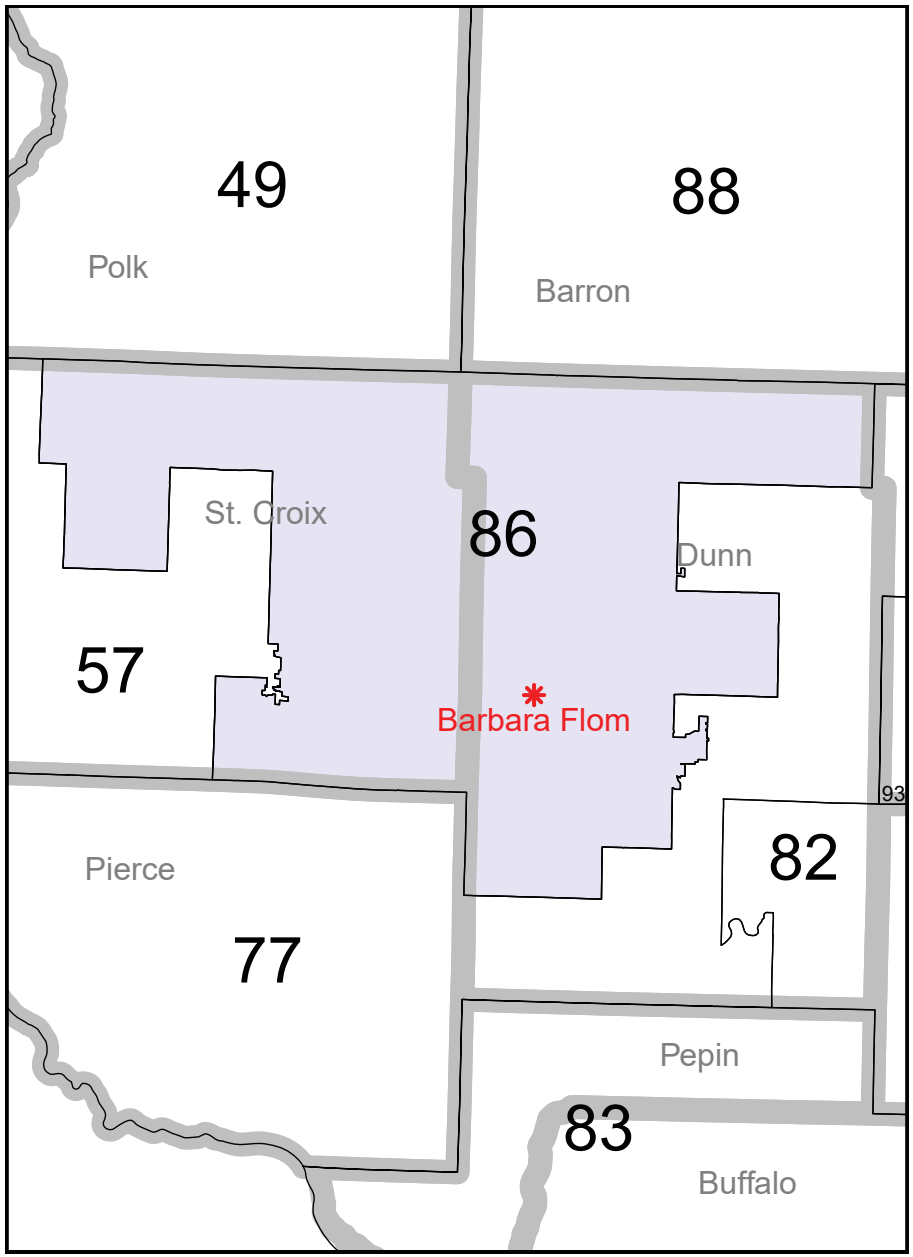
Plaintiff: Jennifer Estrada (Manitowoc, WI)
District 70 of Simulated Plan 43995
(49.93% Republican Vote Share)



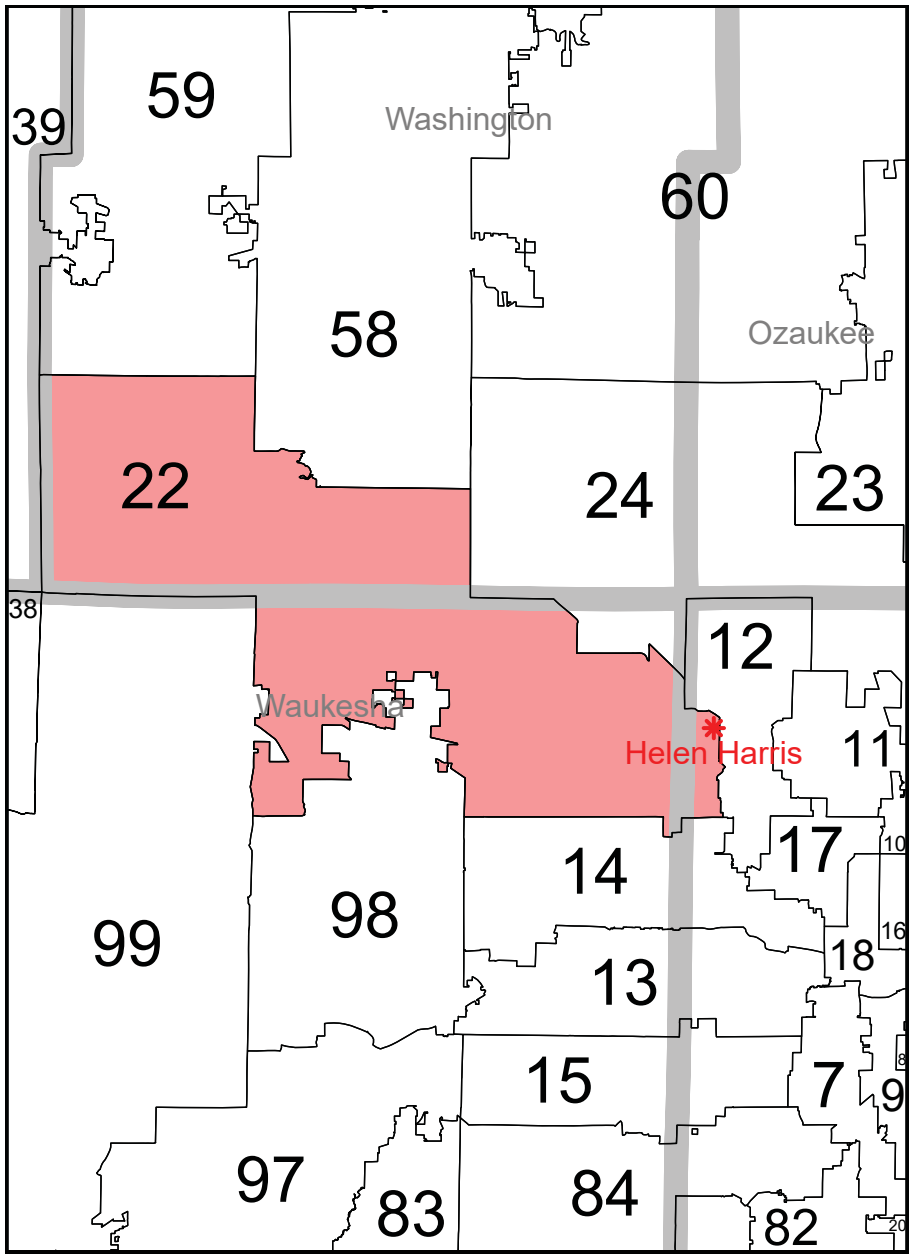
Plaintiff: Barbara Flom (Knapp, WI)
District 29 of Act 43 Assembly Plan
(50.54% Republican Vote Share)



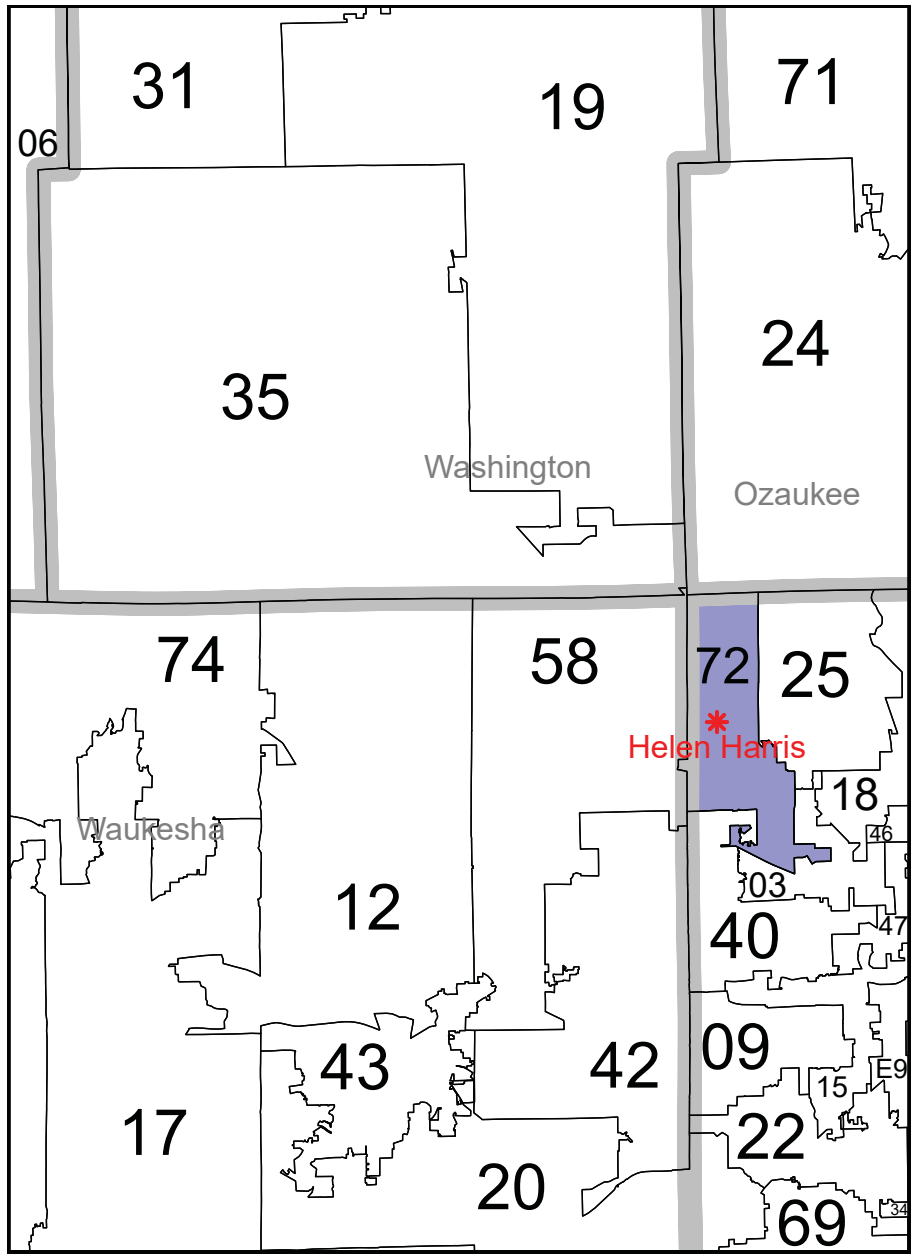
Plaintiff: Barbara Flom (Knapp, WI)
District 86 of Simulated Plan 43995
(49.81% Republican Vote Share)



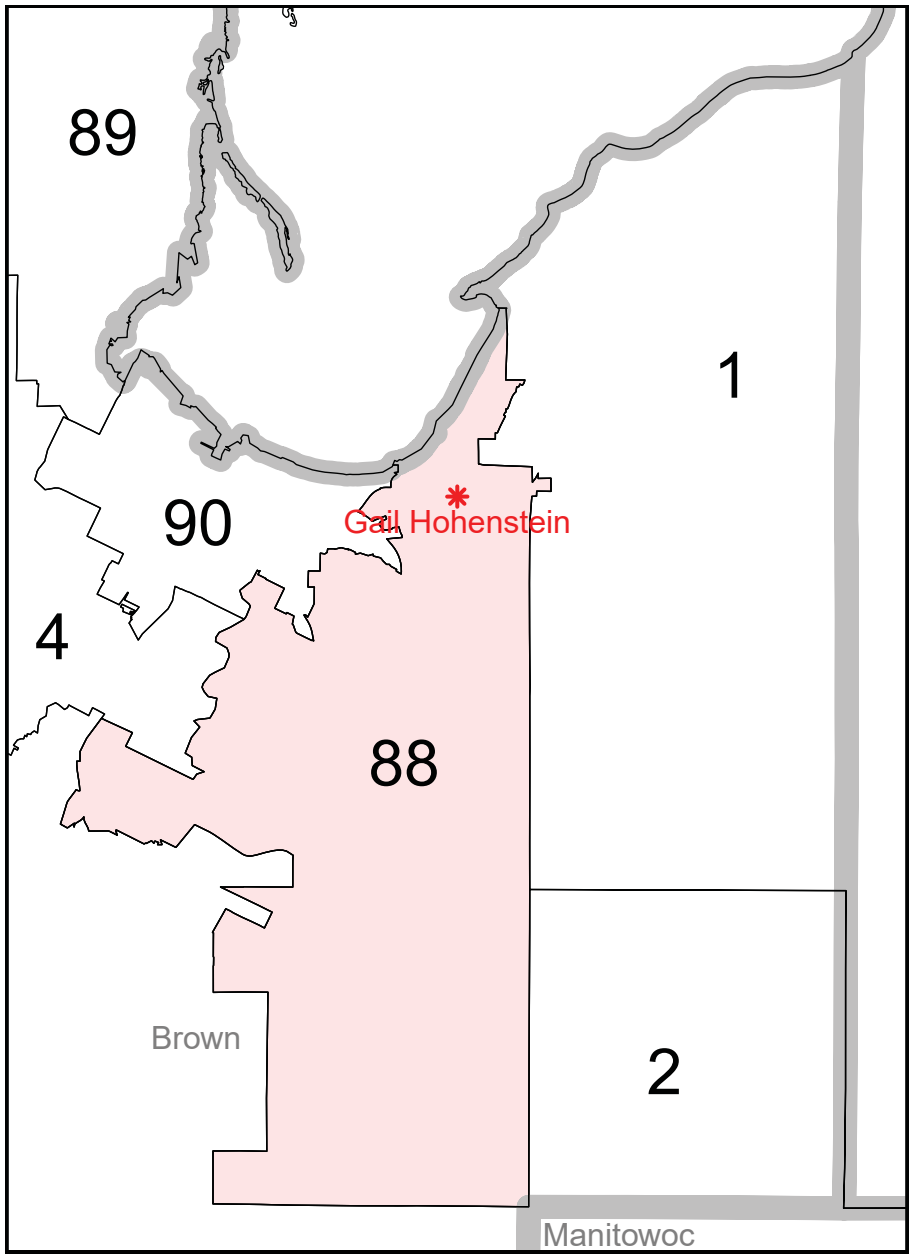
Plaintiff: Helen Harris (Milwaukee, WI)
District 22 of Act 43 Assembly Plan
(66.25% Republican Vote Share)



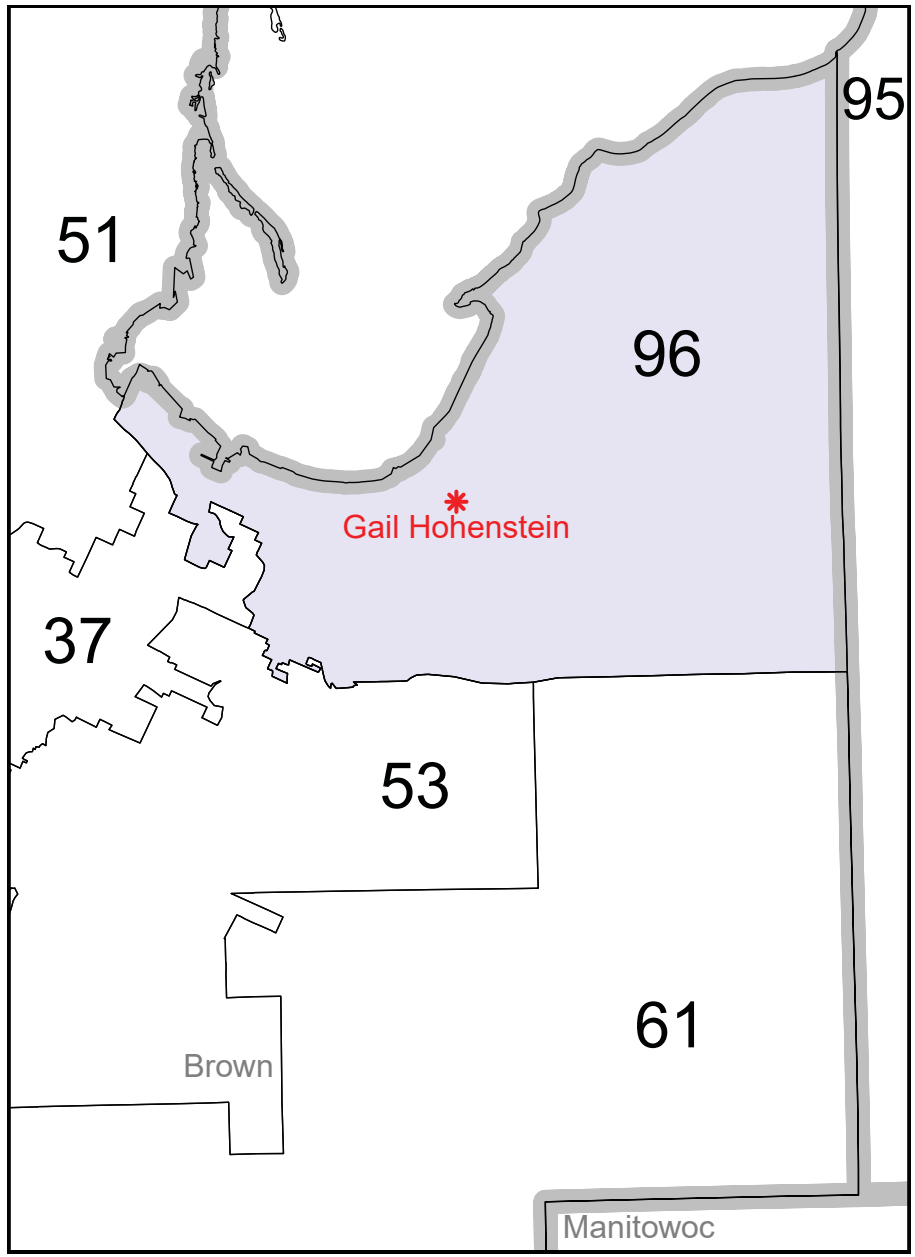
Plaintiff: Helen Harris (Milwaukee, WI)
District 72 of Simulated Plan 43995
(30.14% Republican Vote Share)



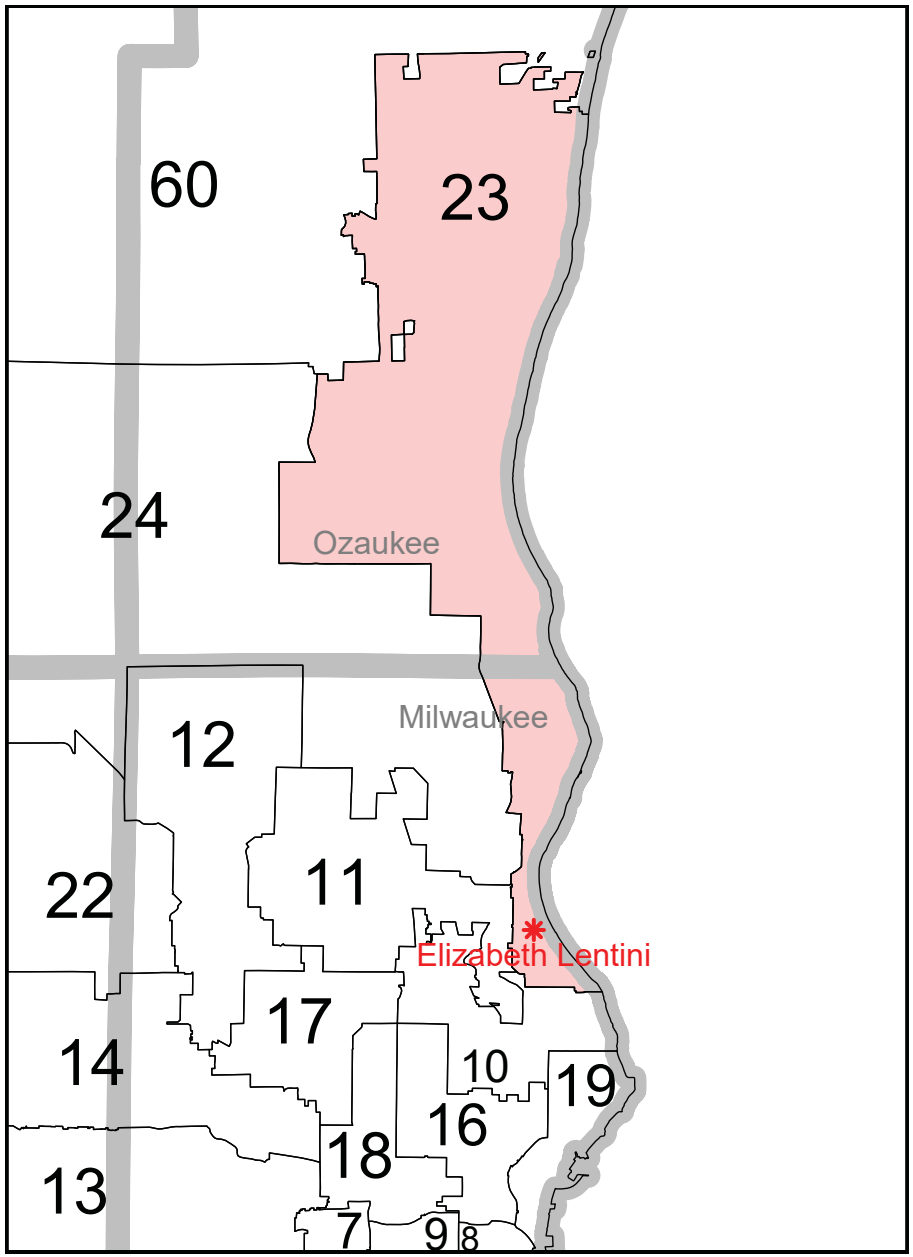
Plaintiff: Gail Hohenstein (Green Bay, WI)
District 88 of Act 43 Assembly Plan
(53.15% Republican Vote Share)



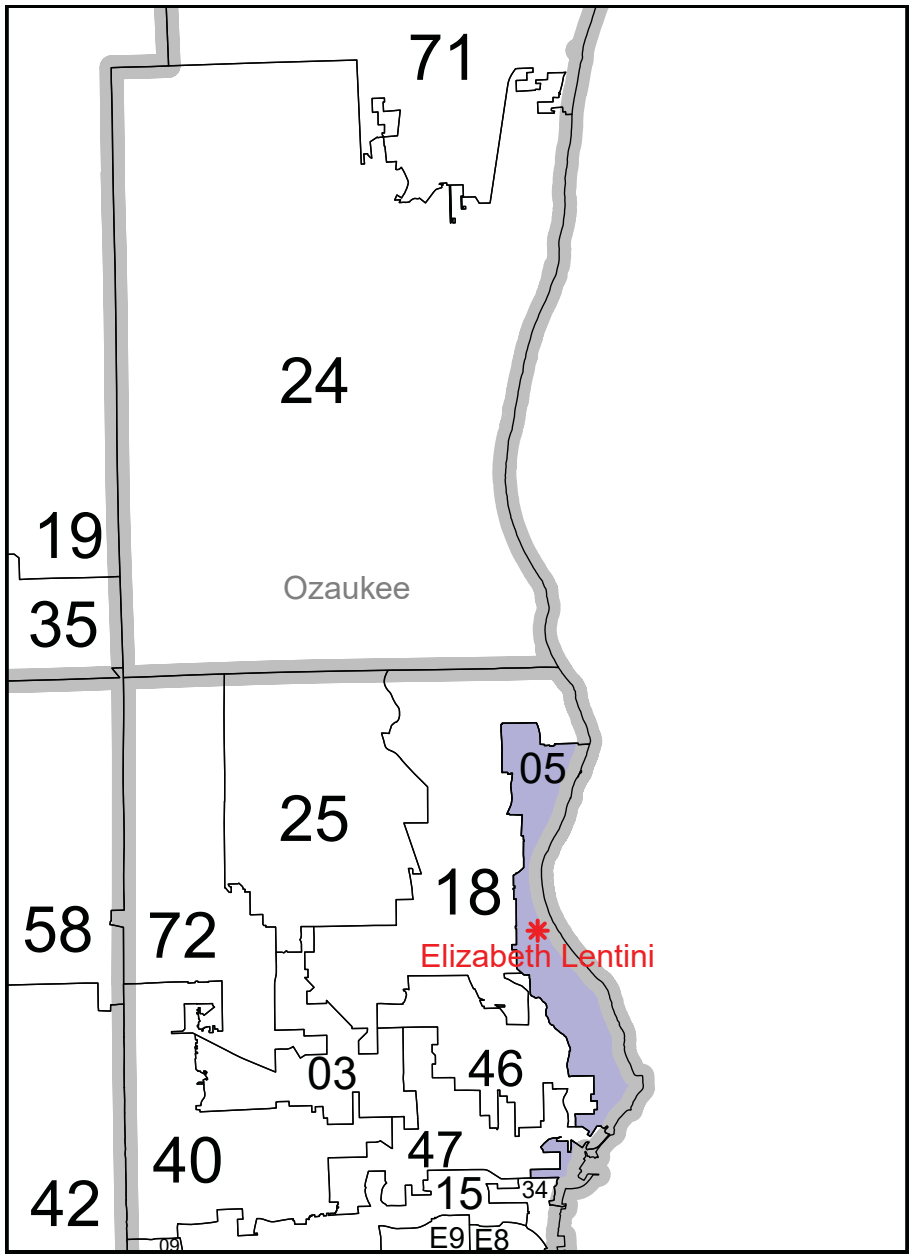
Plaintiff: Gail Hohenstein (Green Bay, WI)
District 96 of Simulated Plan 43995
(48.03% Republican Vote Share)



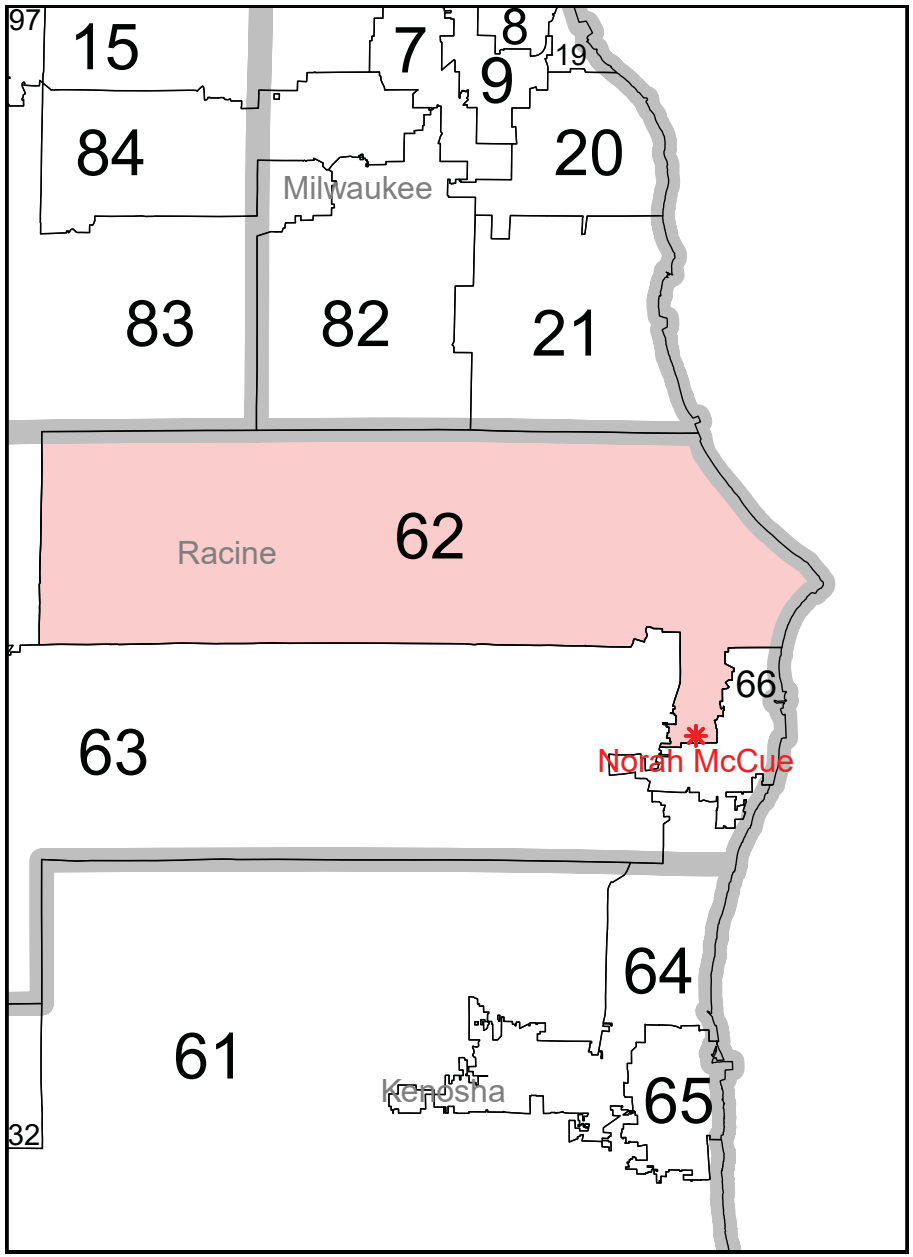
Plaintiff: Elizabeth Lentini (Whitefish Bay, WI)
District 23 of Act 43 Assembly Plan
(57.01% Republican Vote Share)



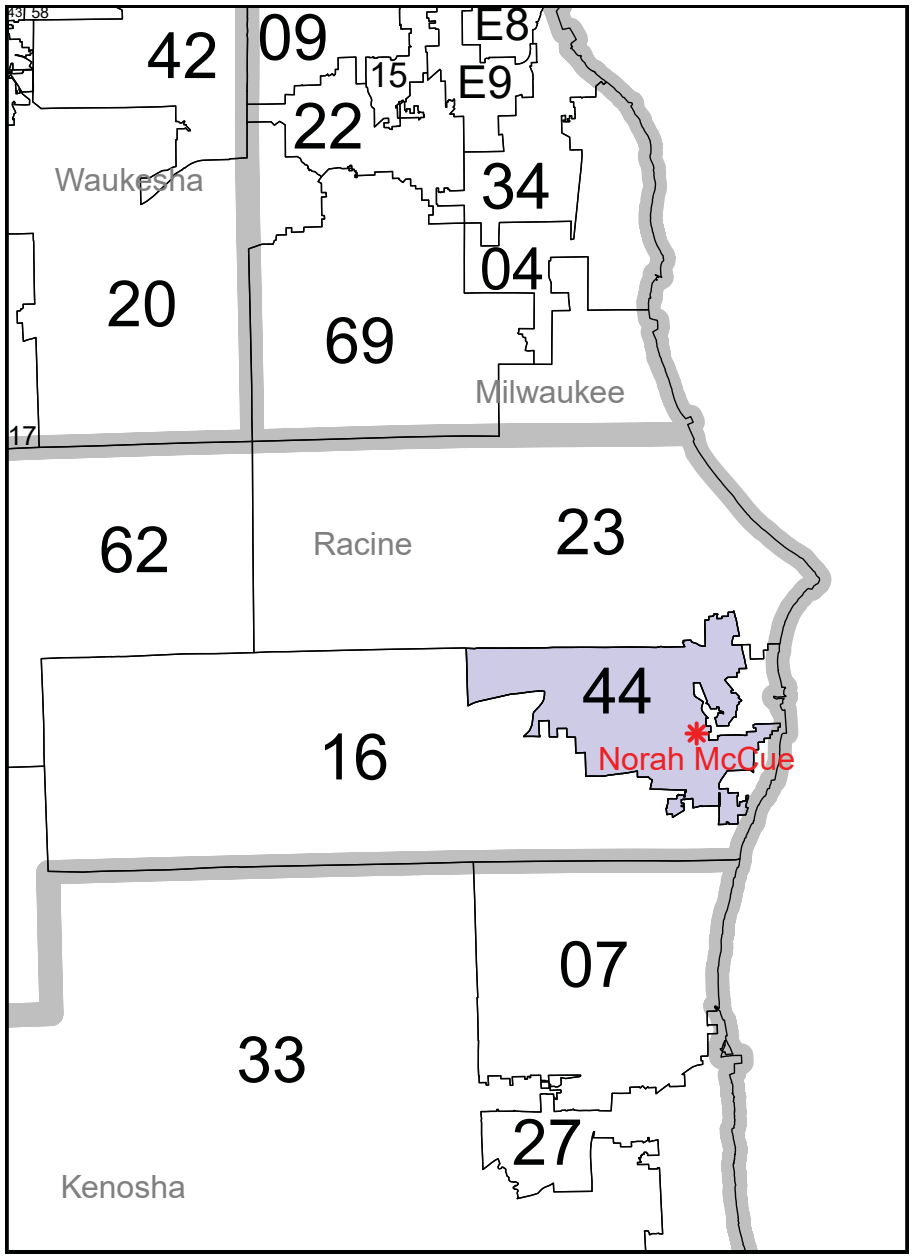
Plaintiff: Elizabeth Lentini (Whitefish Bay, WI)
District 5 of Simulated Plan 43995
(37.05% Republican Vote Share)



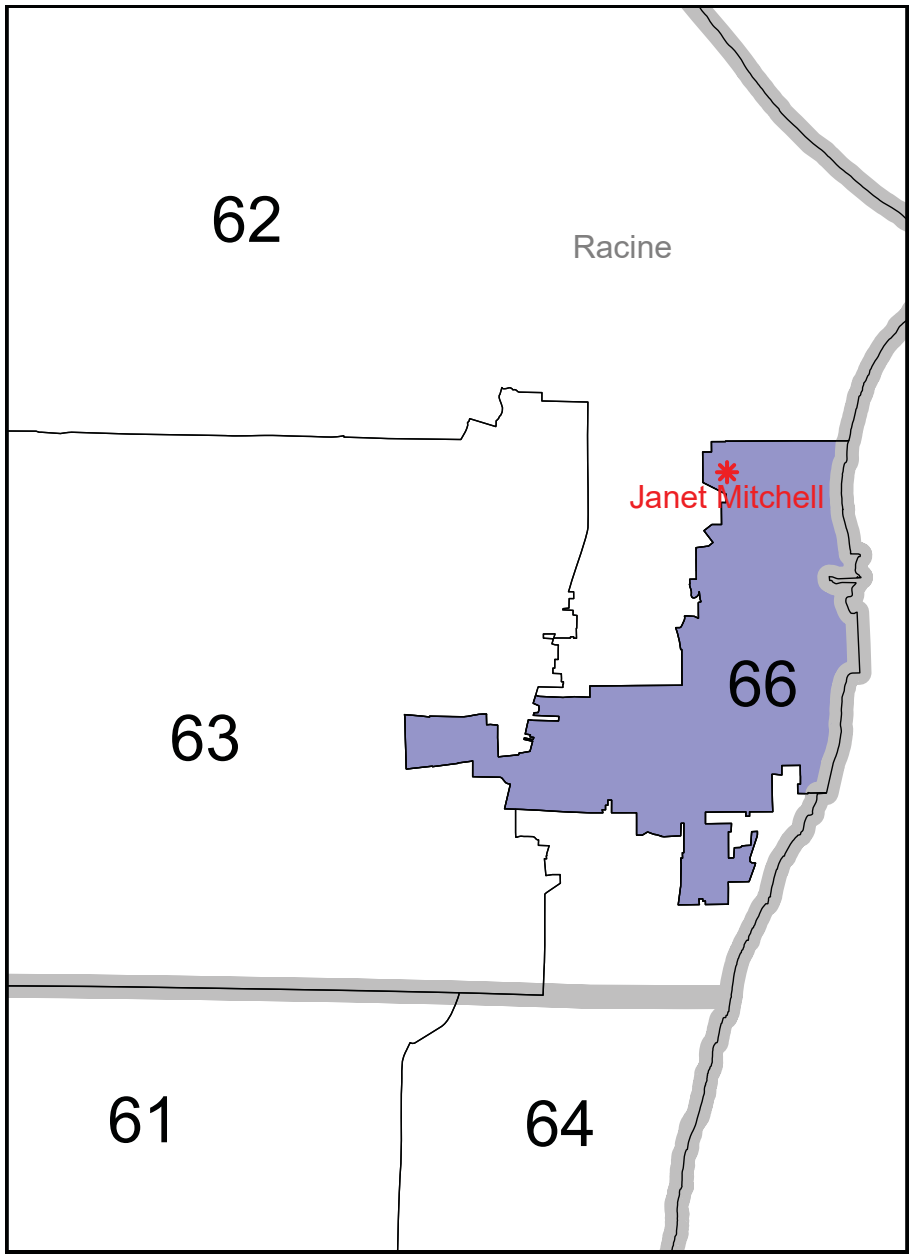
Plaintiff: Norah McCue (Racine, WI)
District 62 of Act 43 Assembly Plan
(56.17% Republican Vote Share)



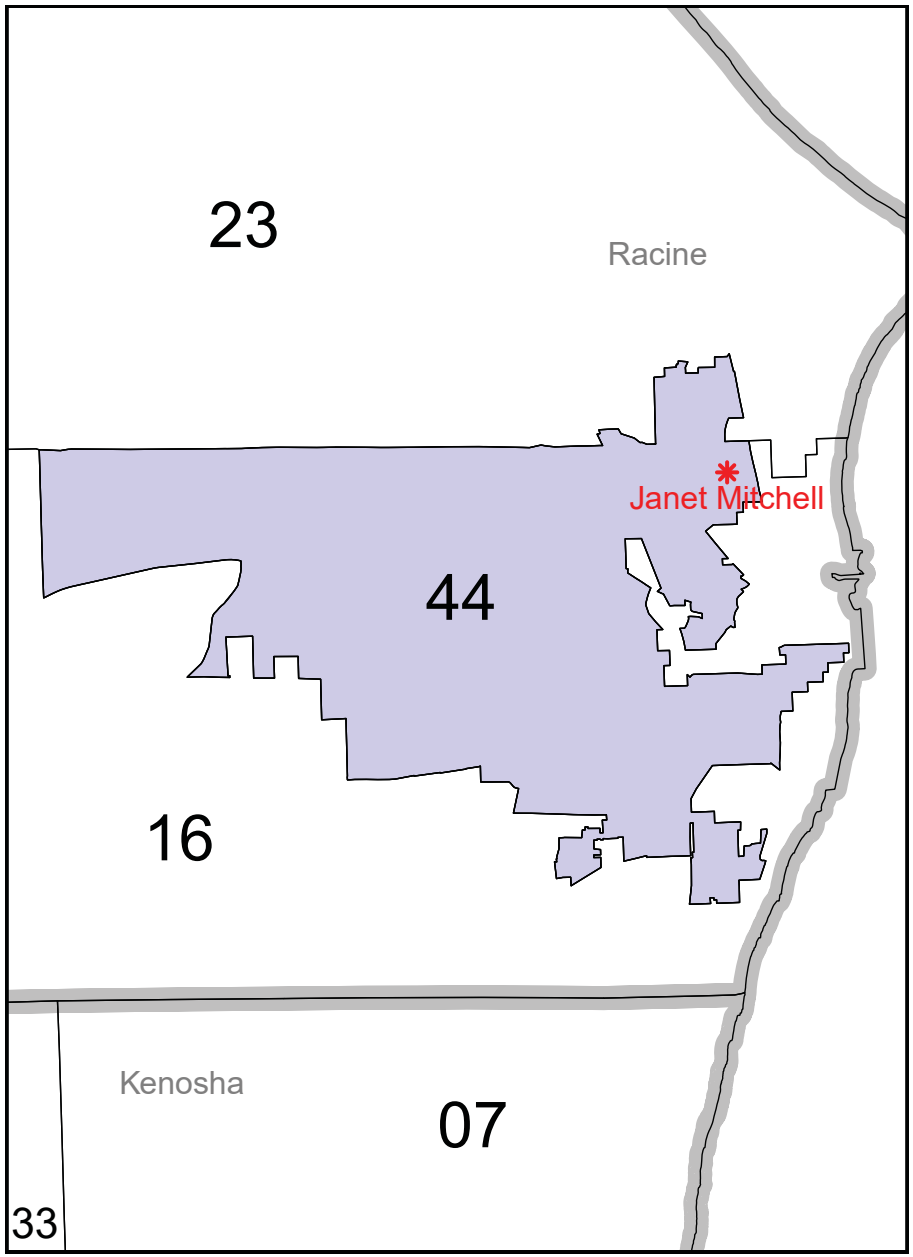
Plaintiff: Norah McCue (Racine, WI)
District 44 of Simulated Plan 43995
(43.57% Republican Vote Share)



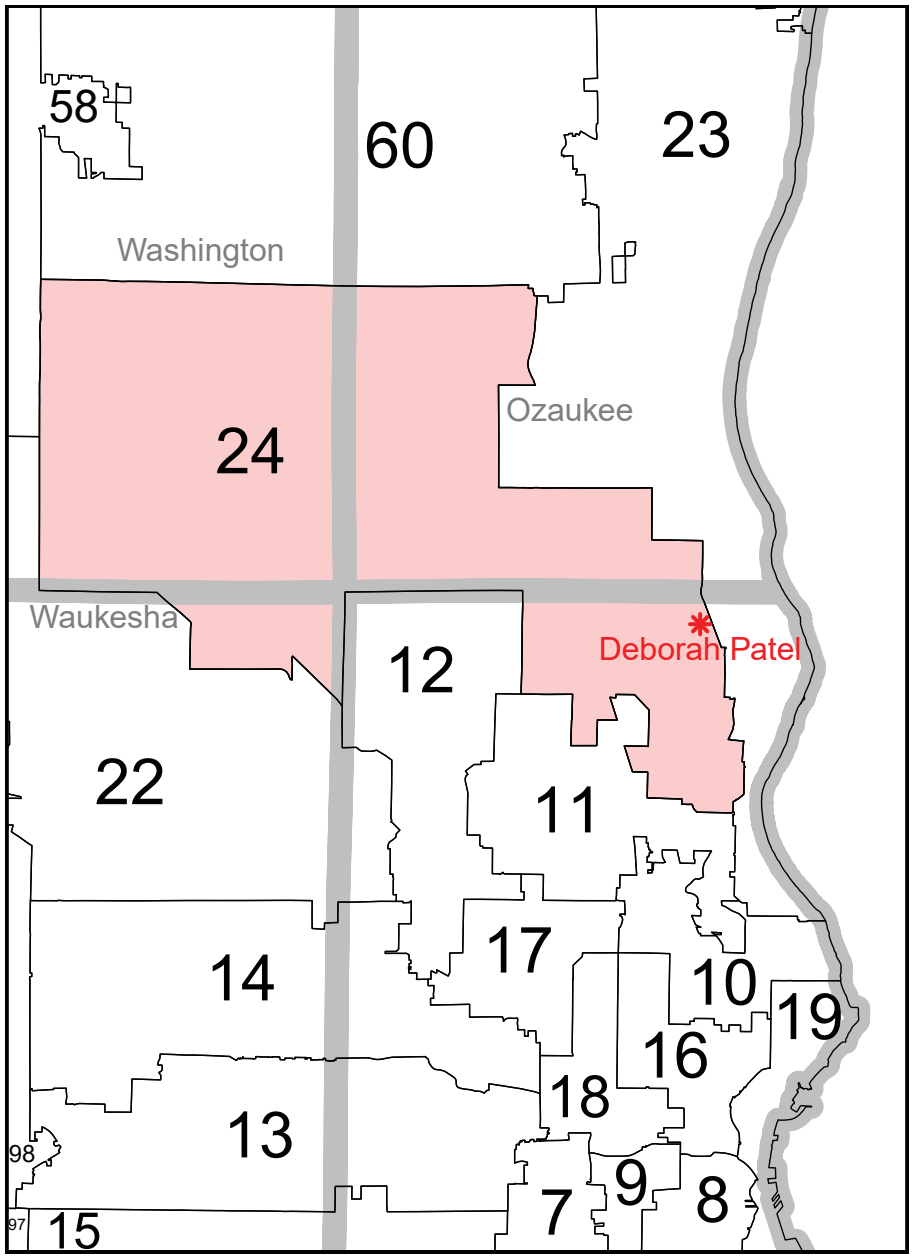
Plaintiff: Janet Mitchell (Racine, WI)
District 66 of Act 43 Assembly Plan
(33.01% Republican Vote Share)



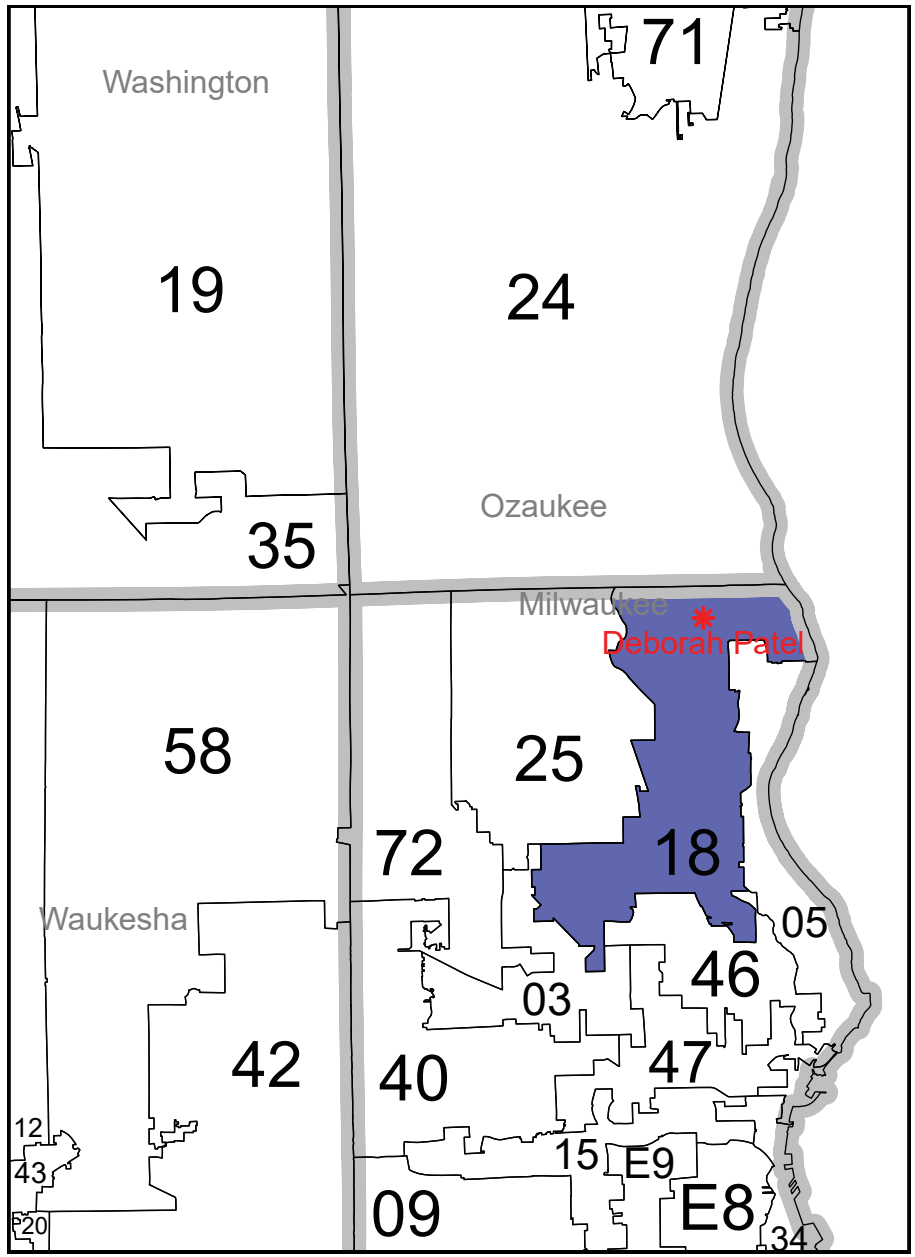
Plaintiff: Janet Mitchell (Racine, WI)
District 44 of Simulated Plan 43995
(43.57% Republican Vote Share)



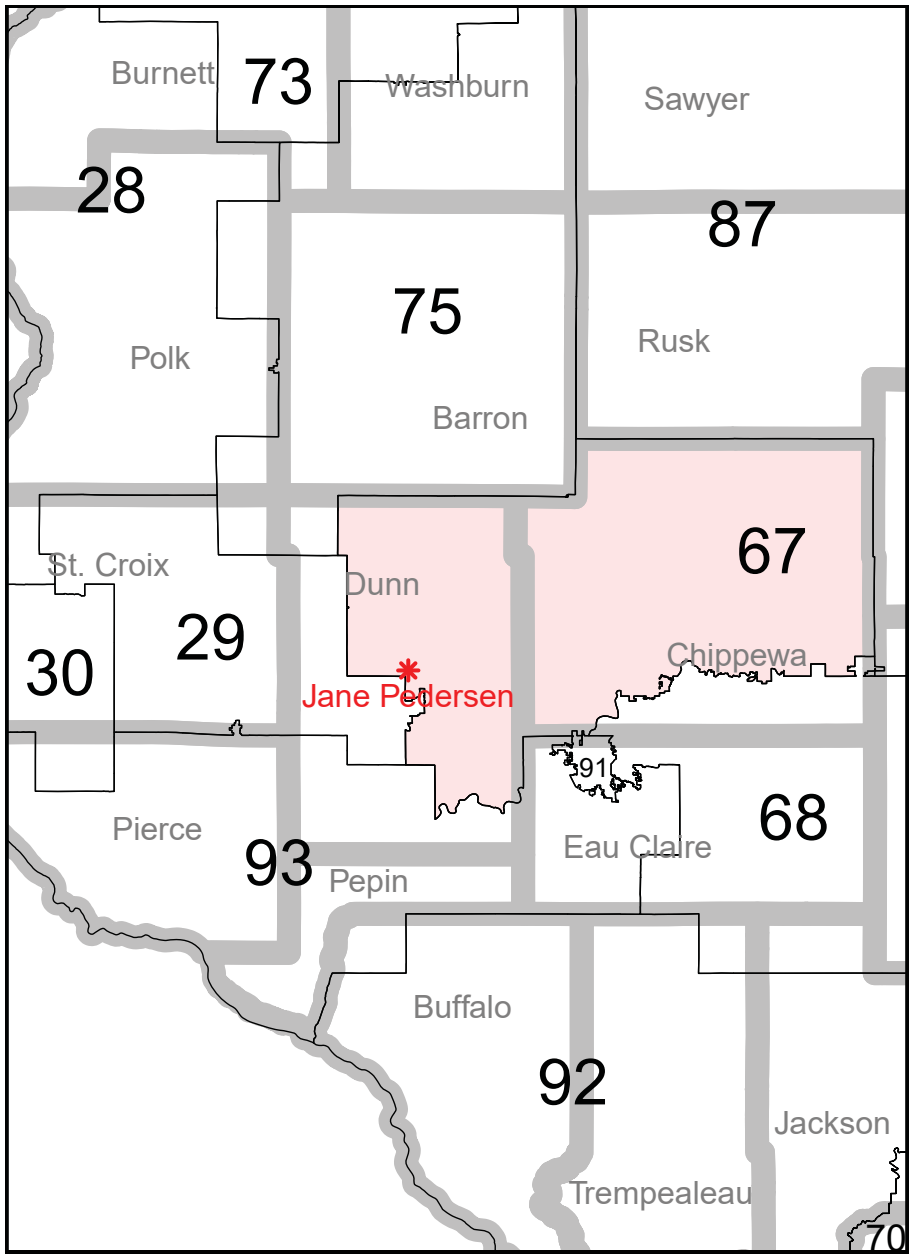
Plaintiff: Deborah Patel (Milwaukee, WI)
District 24 of Act 43 Assembly Plan
(58.14% Republican Vote Share)



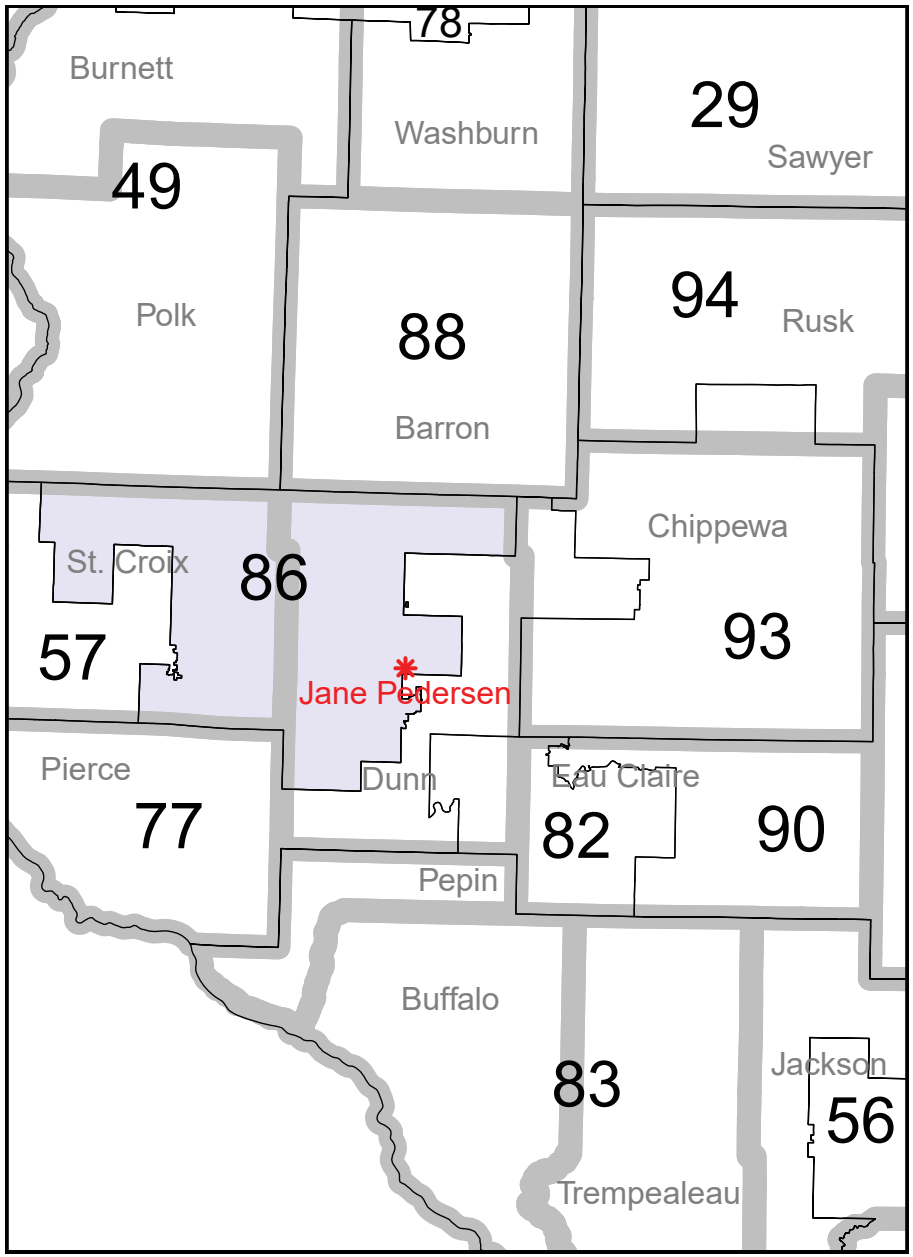
Plaintiff: Deborah Patel (Milwaukee, WI)
District 18 of Simulated Plan 43995
(24.93% Republican Vote Share)



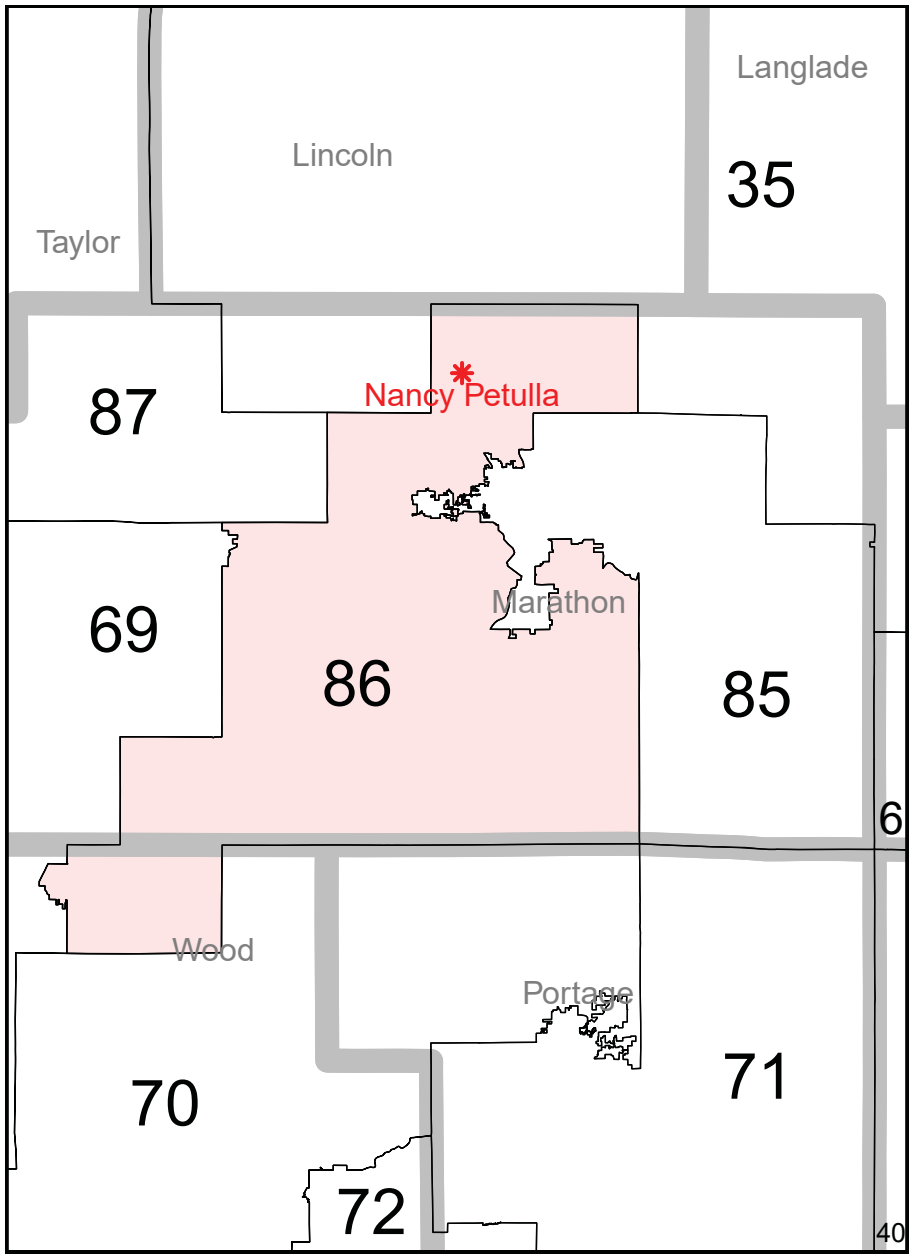
Plaintiff: Jane Pedersen (Menomonie, WI)
District 67 of Act 43 Assembly Plan
(51.31% Republican Vote Share)



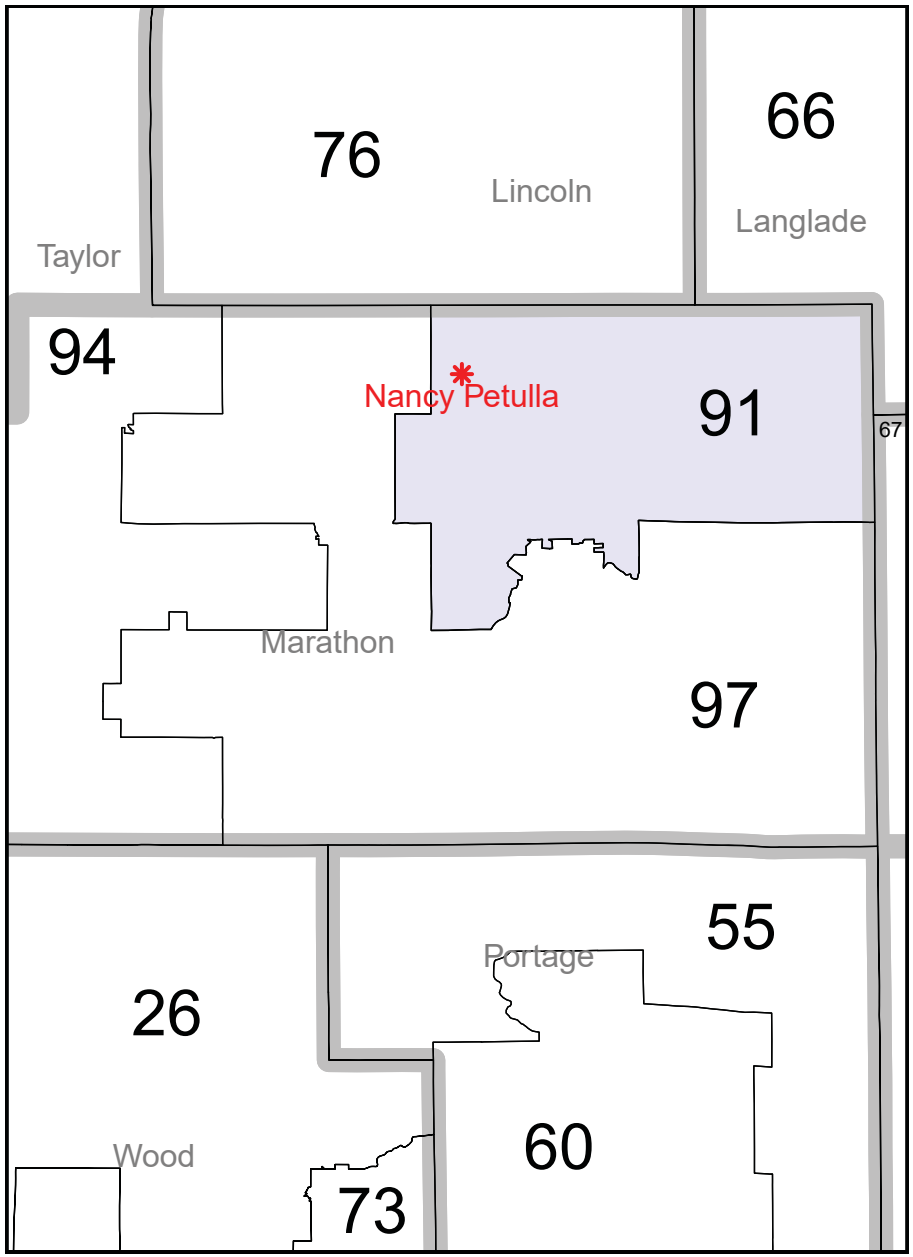
Plaintiff: Jane Pedersen (Menomonie, WI)
District 86 of Simulated Plan 43995
(49.81% Republican Vote Share)



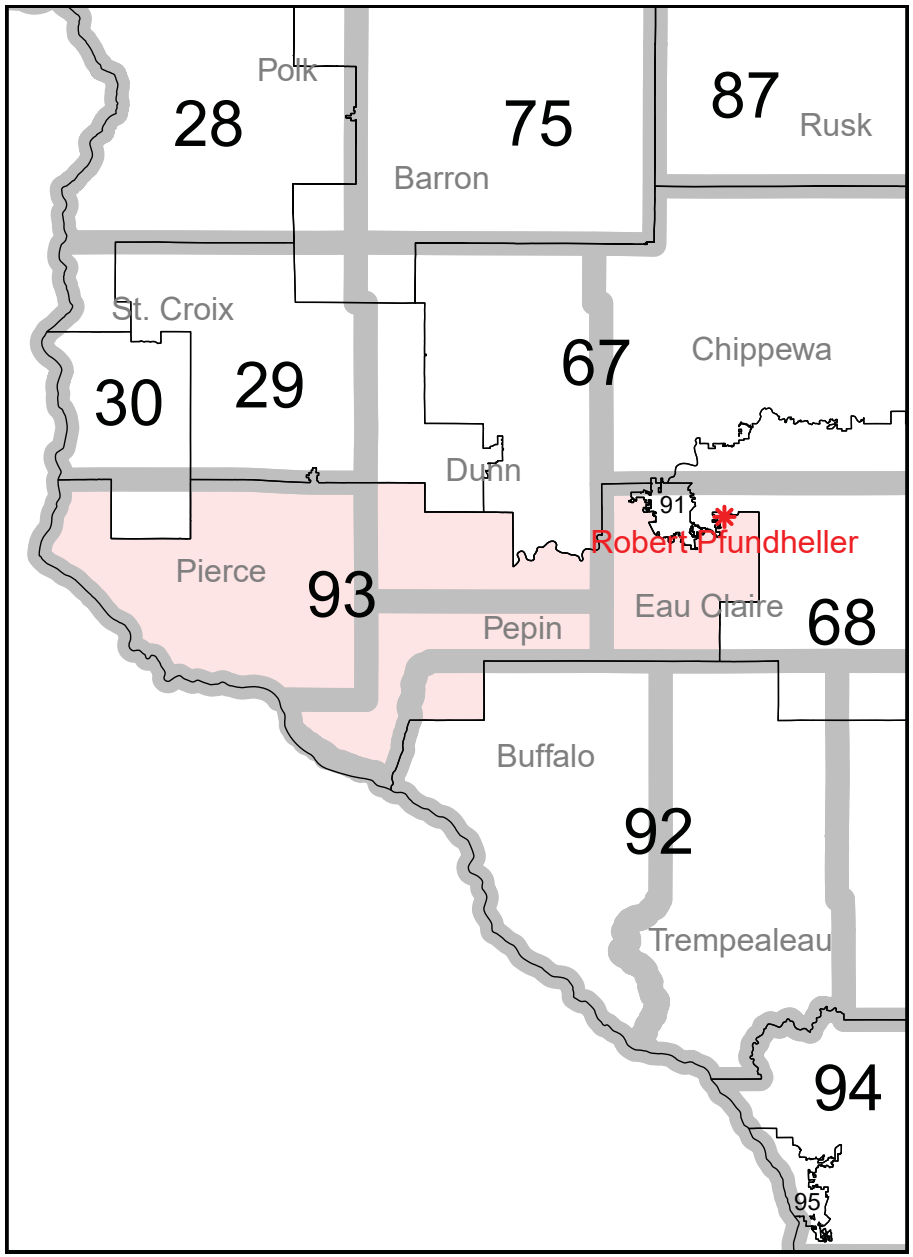
Plaintiff: Nancy Petulla (Merrill, WI)
District 86 of Act 43 Assembly Plan
(54.12% Republican Vote Share)



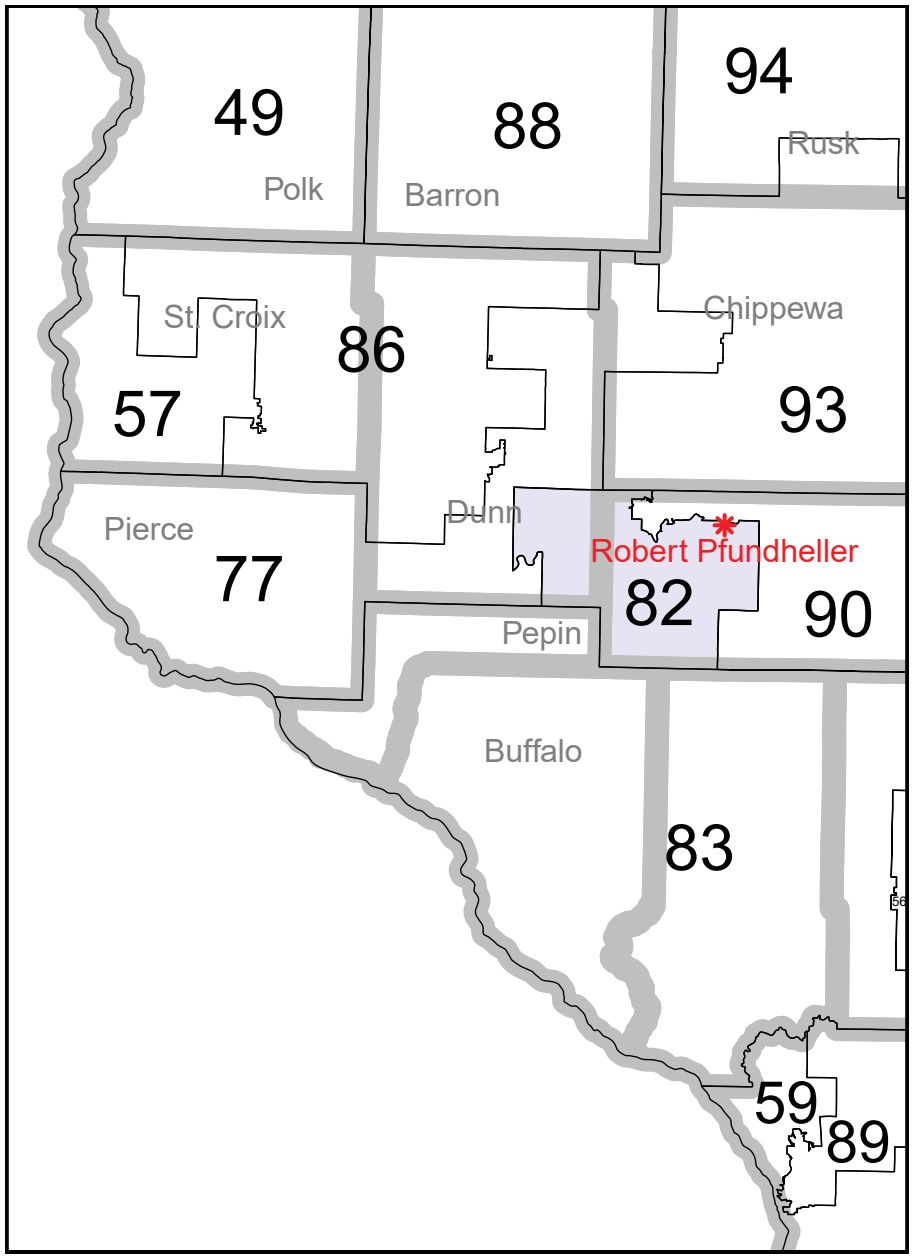
Plaintiff: Nancy Petulla (Merrill, WI)
District 91 of Simulated Plan 43995
(49.98% Republican Vote Share)



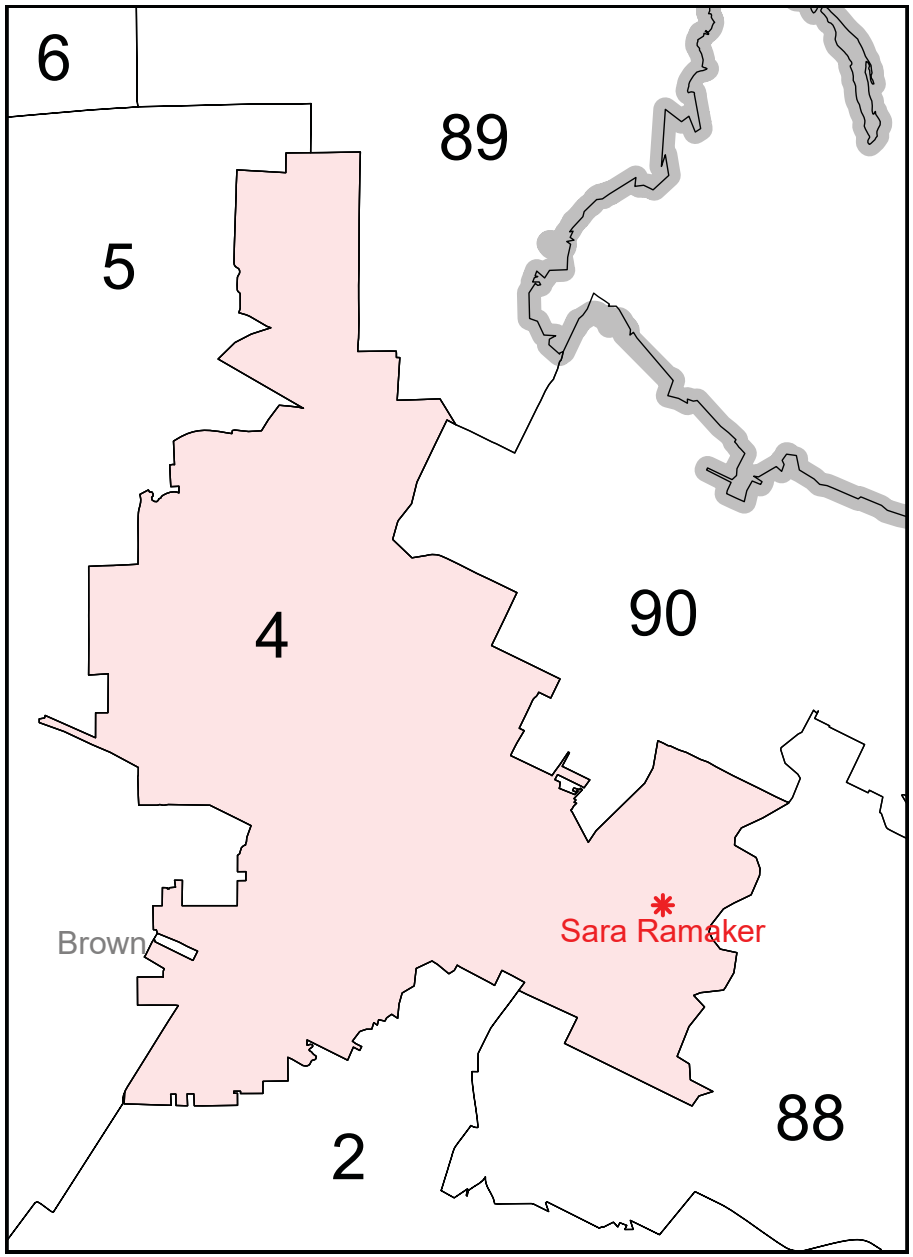
Plaintiff: Robert Pfundheller (Altoona, WI)
District 93 of Act 43 Assembly Plan
(50.69% Republican Vote Share)



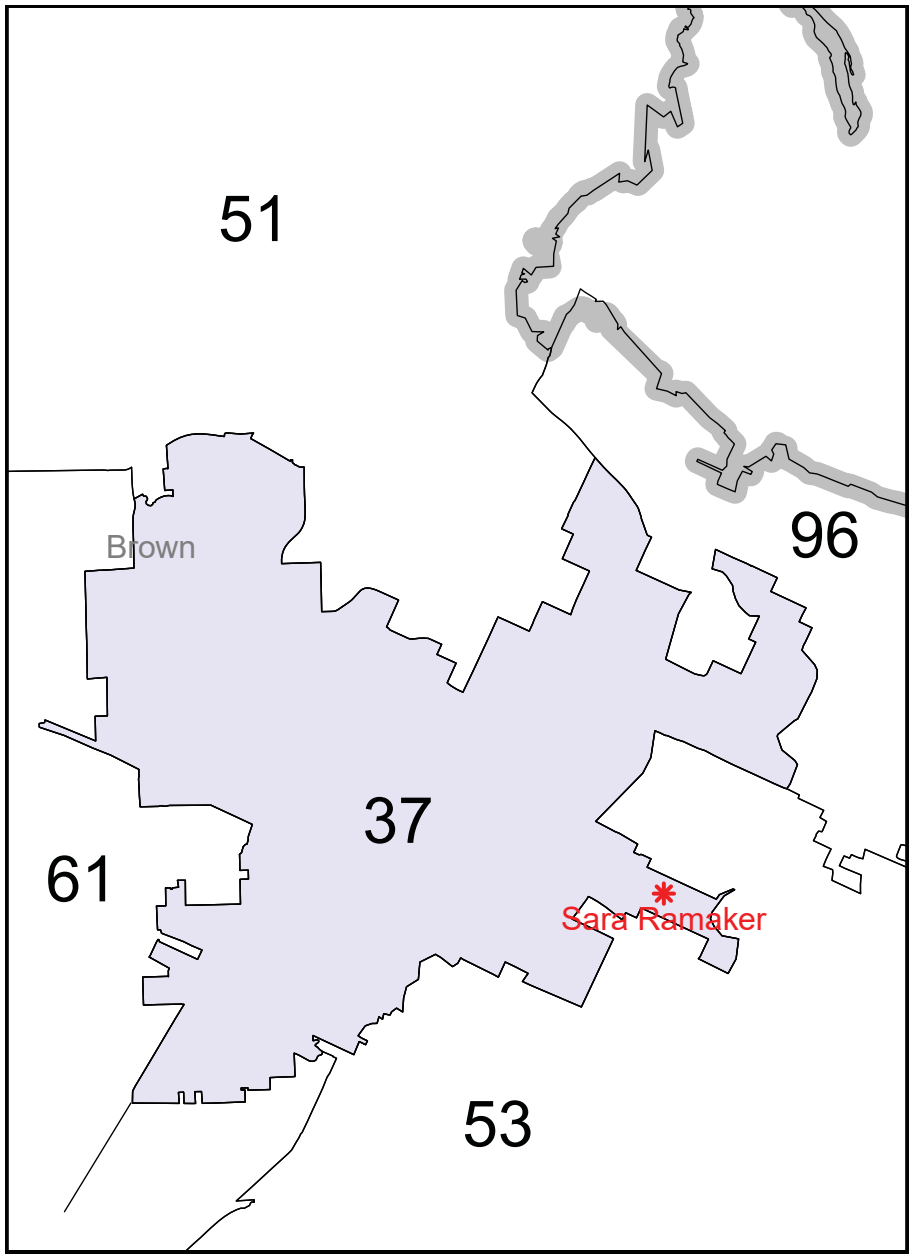
Plaintiff: Robert Pfundheller (Altoona, WI)
District 82 of Simulated Plan 43995
(45.55% Republican Vote Share)



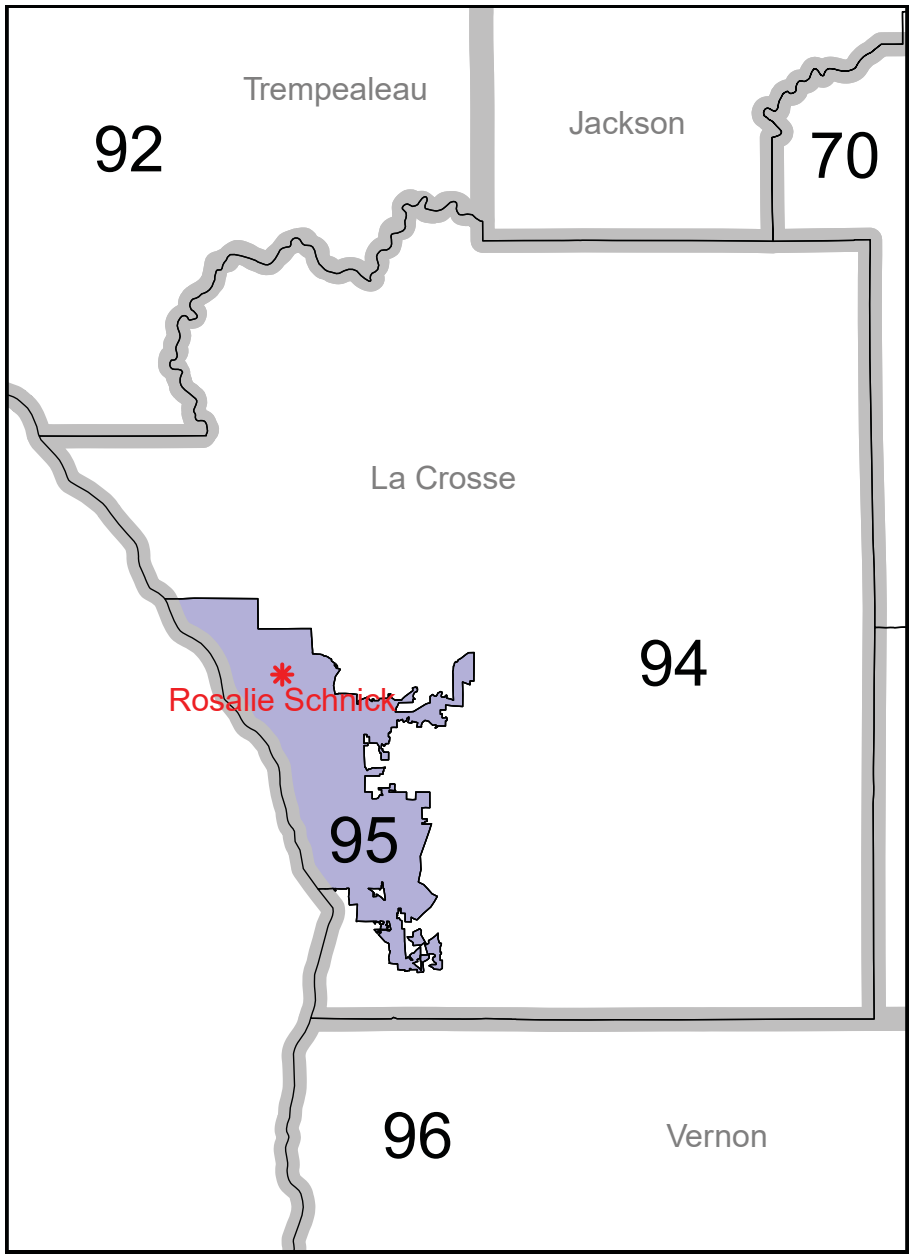
Plaintiff: Sara Ramaker (Green Bay, WI)
District 4 of Act 43 Assembly Plan
(53.68% Republican Vote Share)



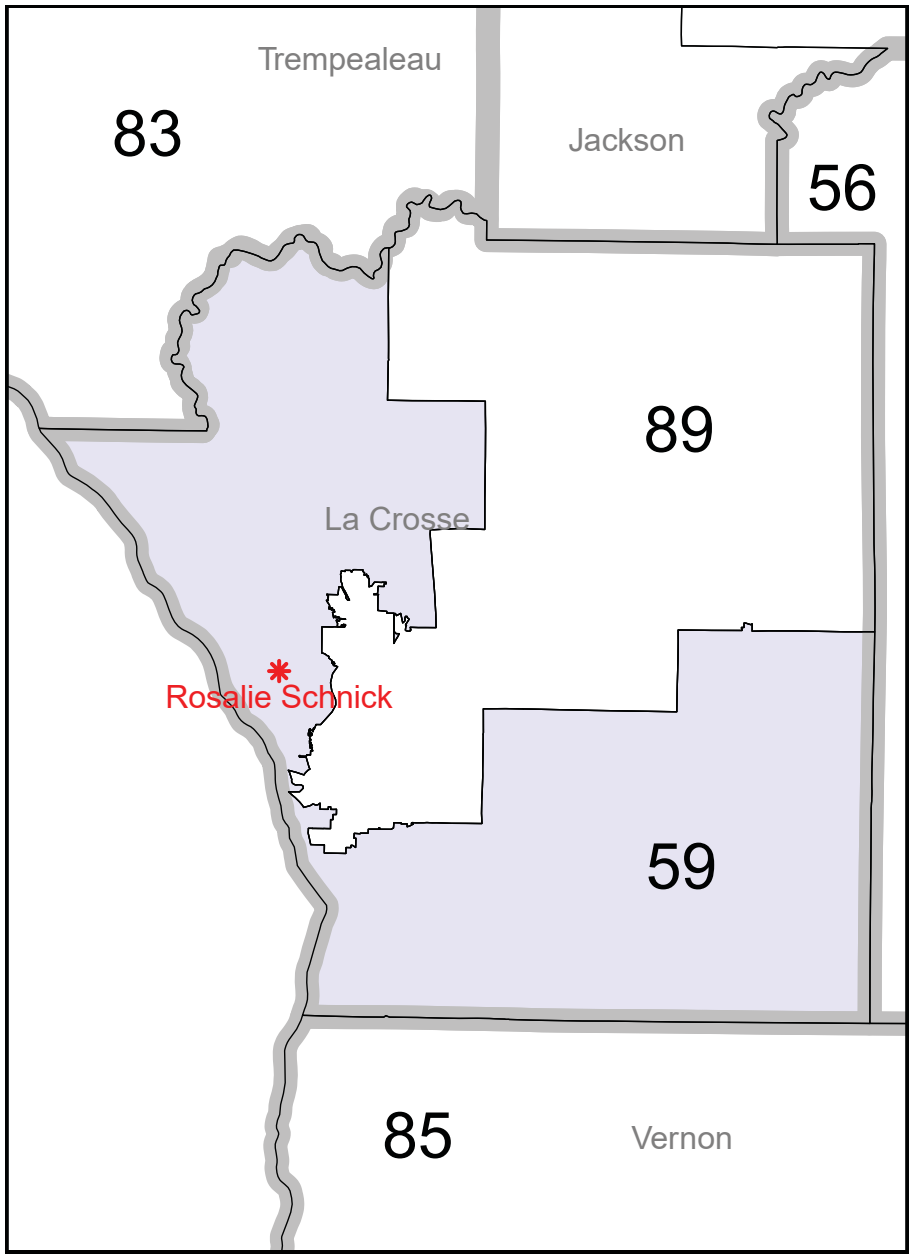
Plaintiff: Sara Ramaker (Green Bay, WI)
District 37 of Simulated Plan 43995
(49.84% Republican Vote Share)



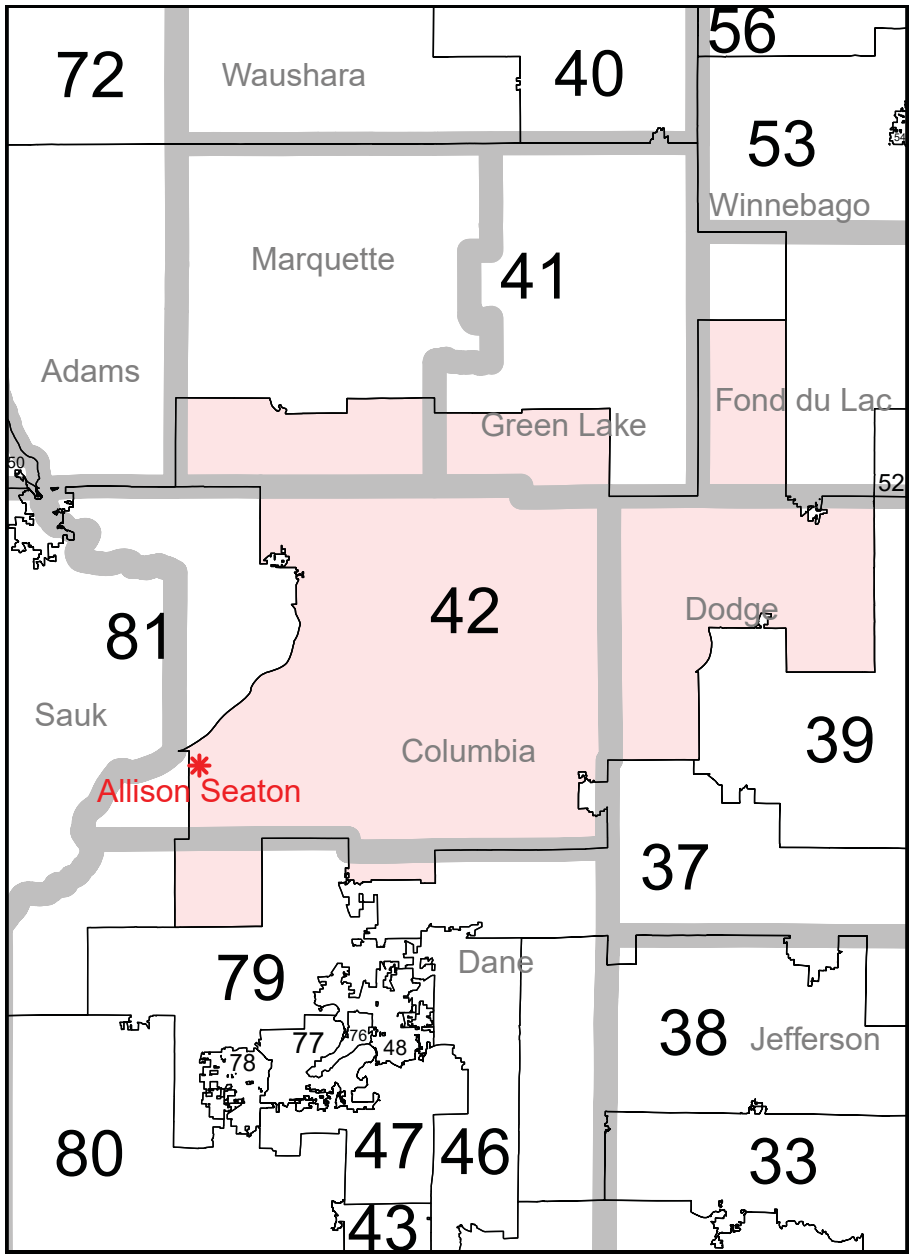
Plaintiff: Rosalie Schnick (LaCrosse, WI)
District 95 of Act 43 Assembly Plan
(38.63% Republican Vote Share)



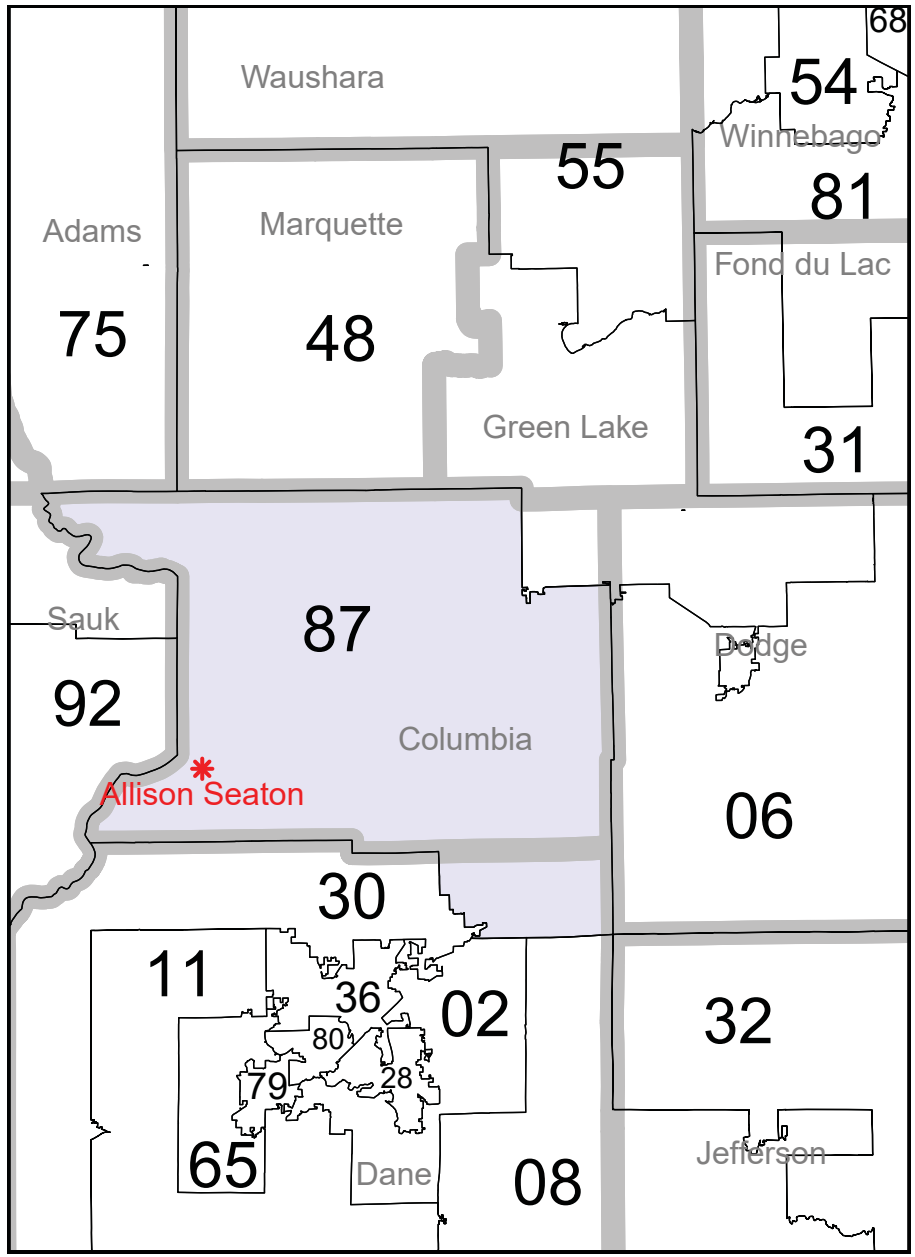
Plaintiff: Rosalie Schnick (LaCrosse, WI)
District 59 of Simulated Plan 43995
(45.29% Republican Vote Share)



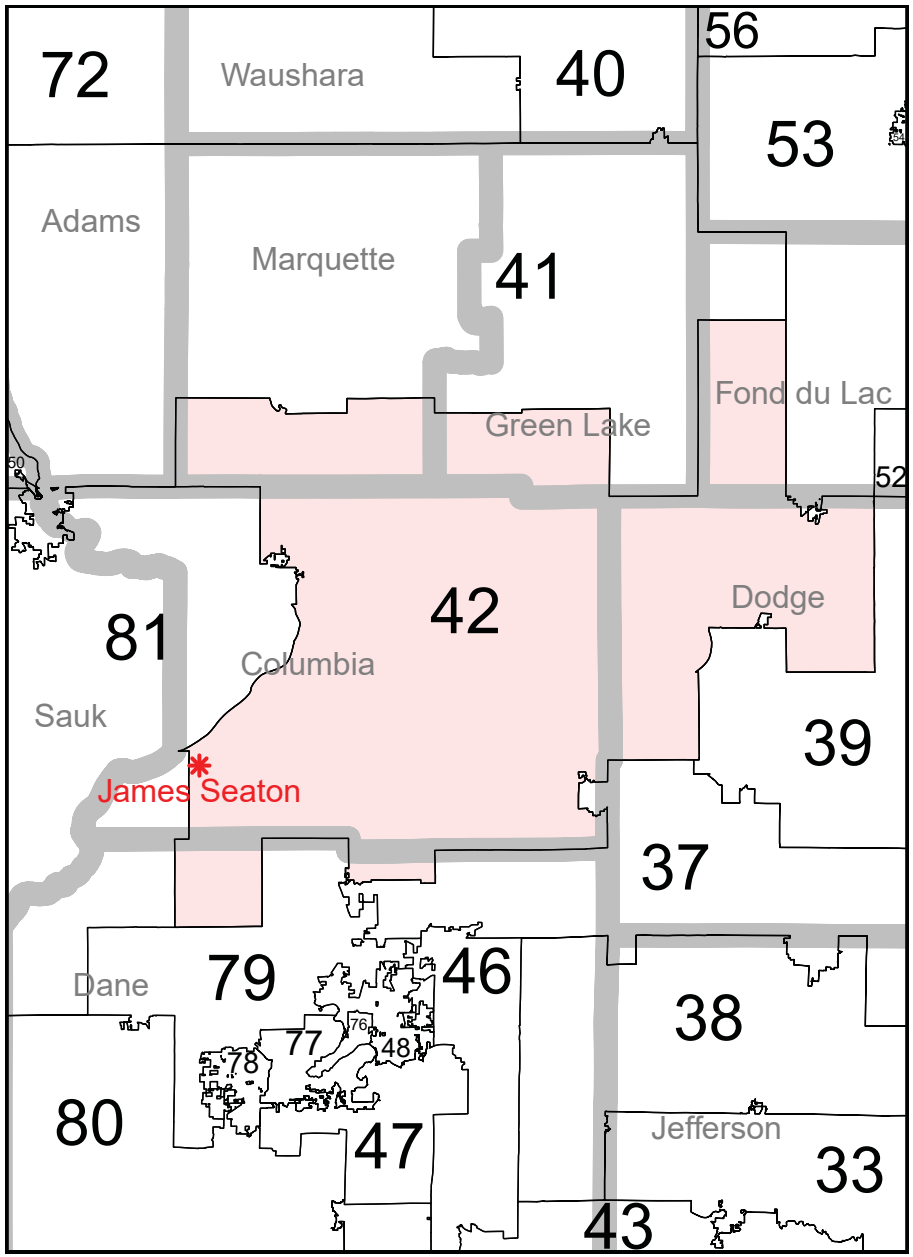
Plaintiff: Allison Seaton (Lodi, WI)
District 42 of Act 43 Assembly Plan
(54.81% Republican Vote Share)



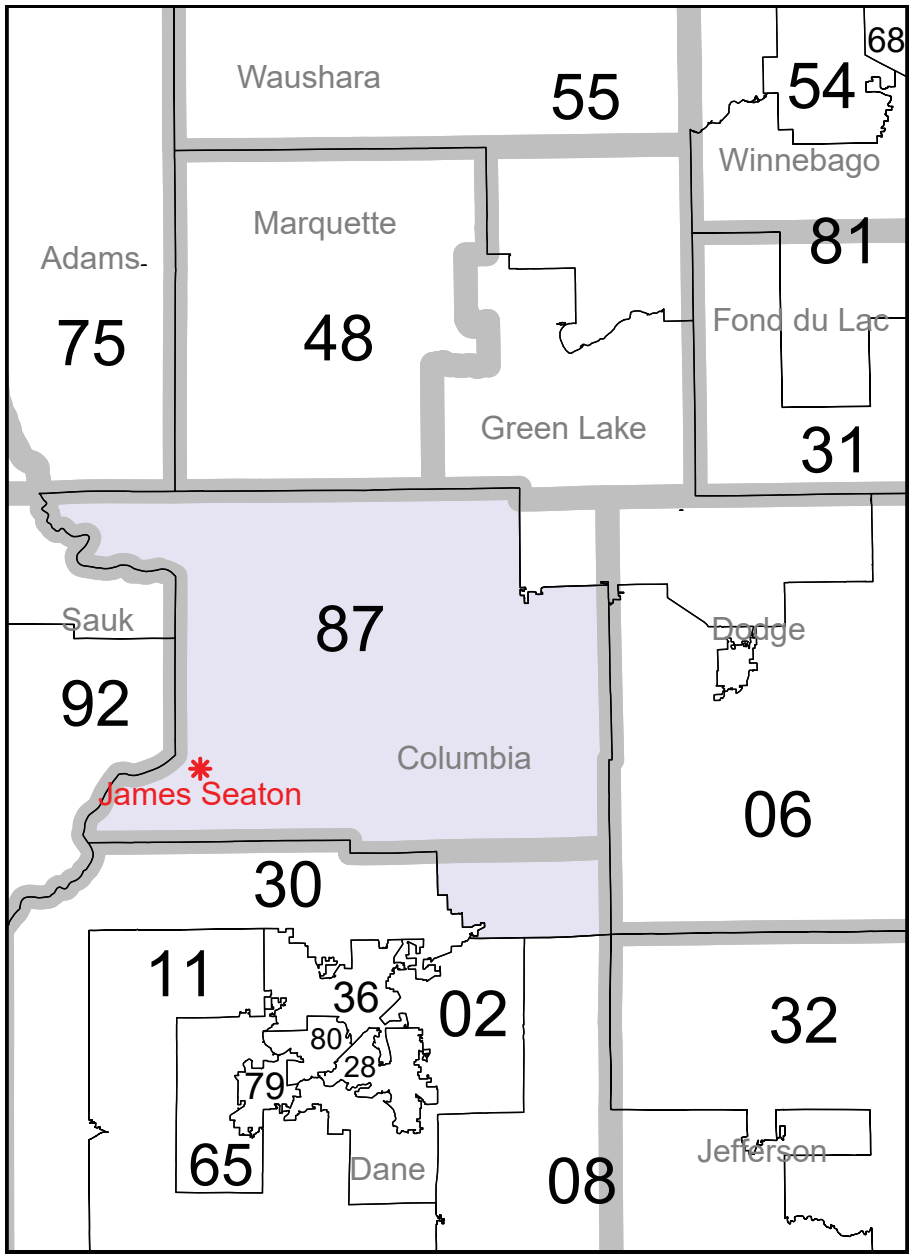
Plaintiff: Allison Seaton (Lodi, WI)
District 87 of Simulated Plan 43995
(49.16% Republican Vote Share)



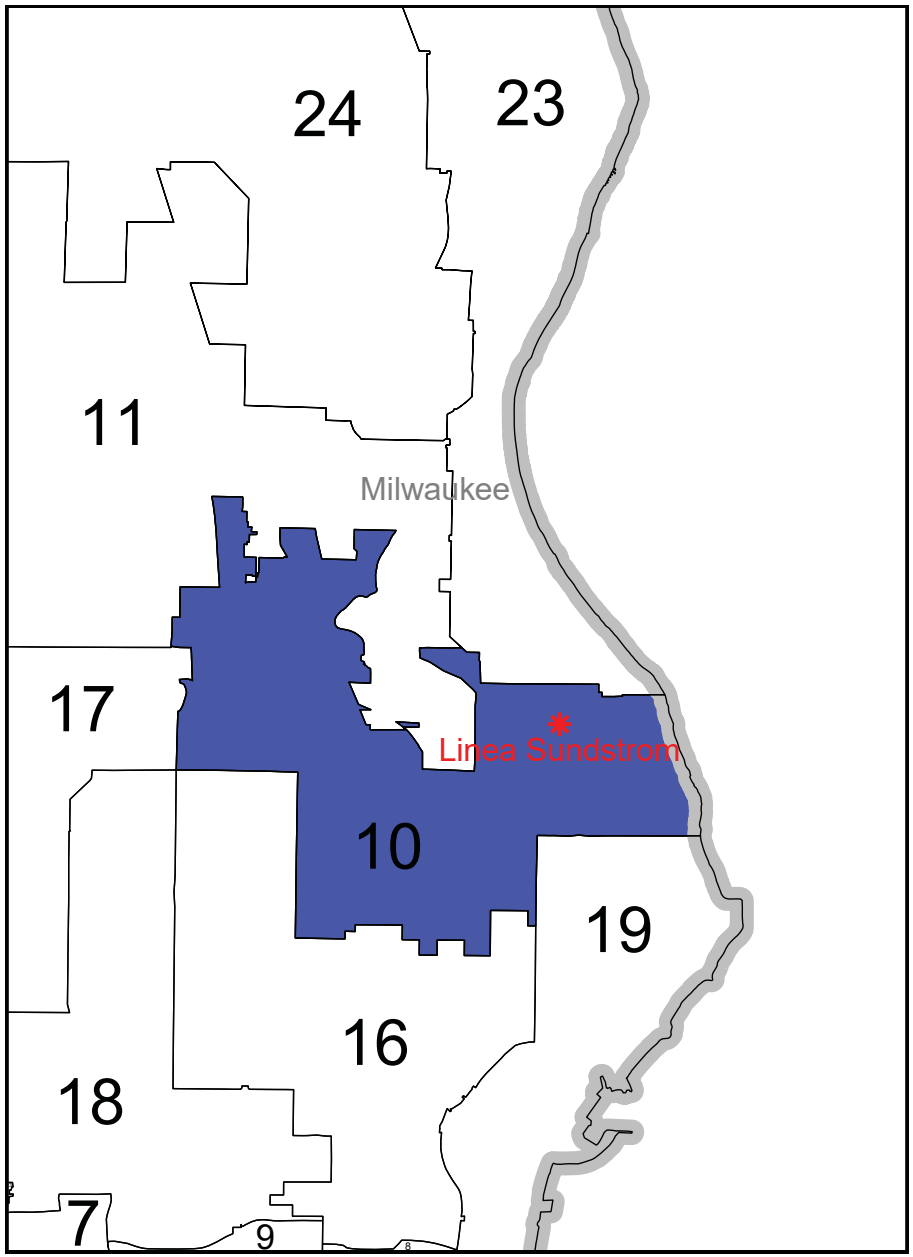
Plaintiff: James Seaton (Lodi, WI)
District 42 of Act 43 Assembly Plan
(54.81% Republican Vote Share)



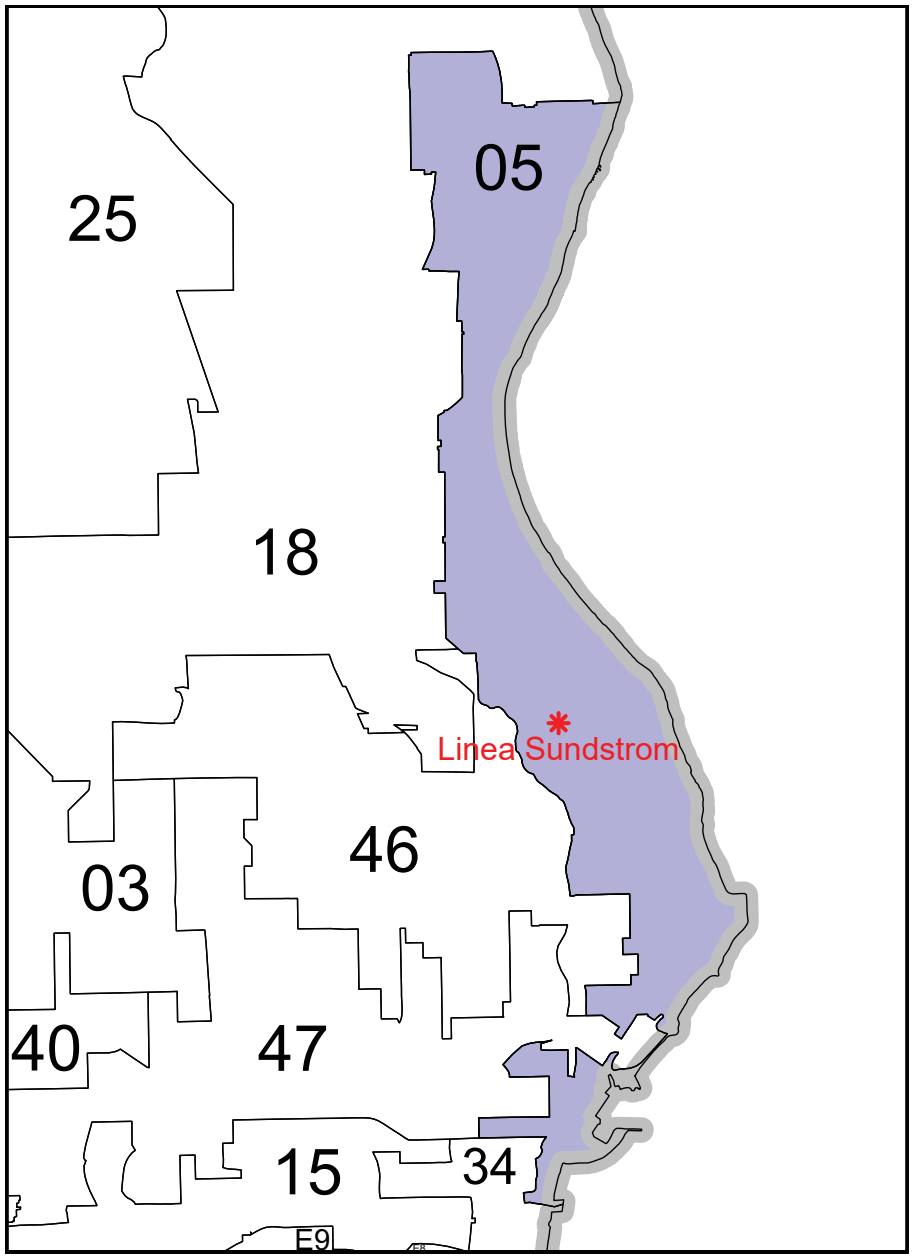
Plaintiff: James Seaton (Lodi, WI)
District 87 of Simulated Plan 43995
(49.16% Republican Vote Share)



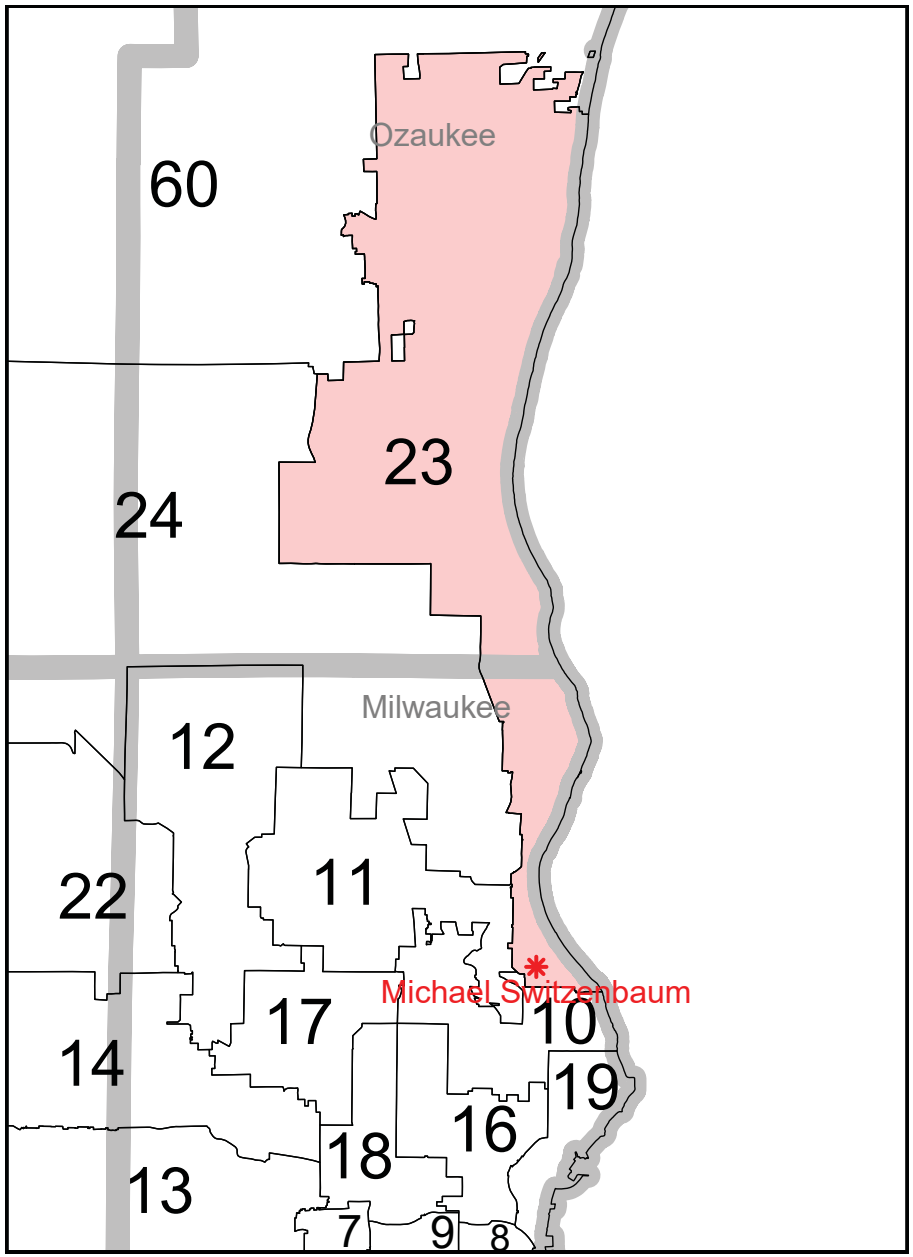
Plaintiff: Linea Sundstrom (Shorewood, WI)
District 10 of Act 43 Assembly Plan
(14.16% Republican Vote Share)



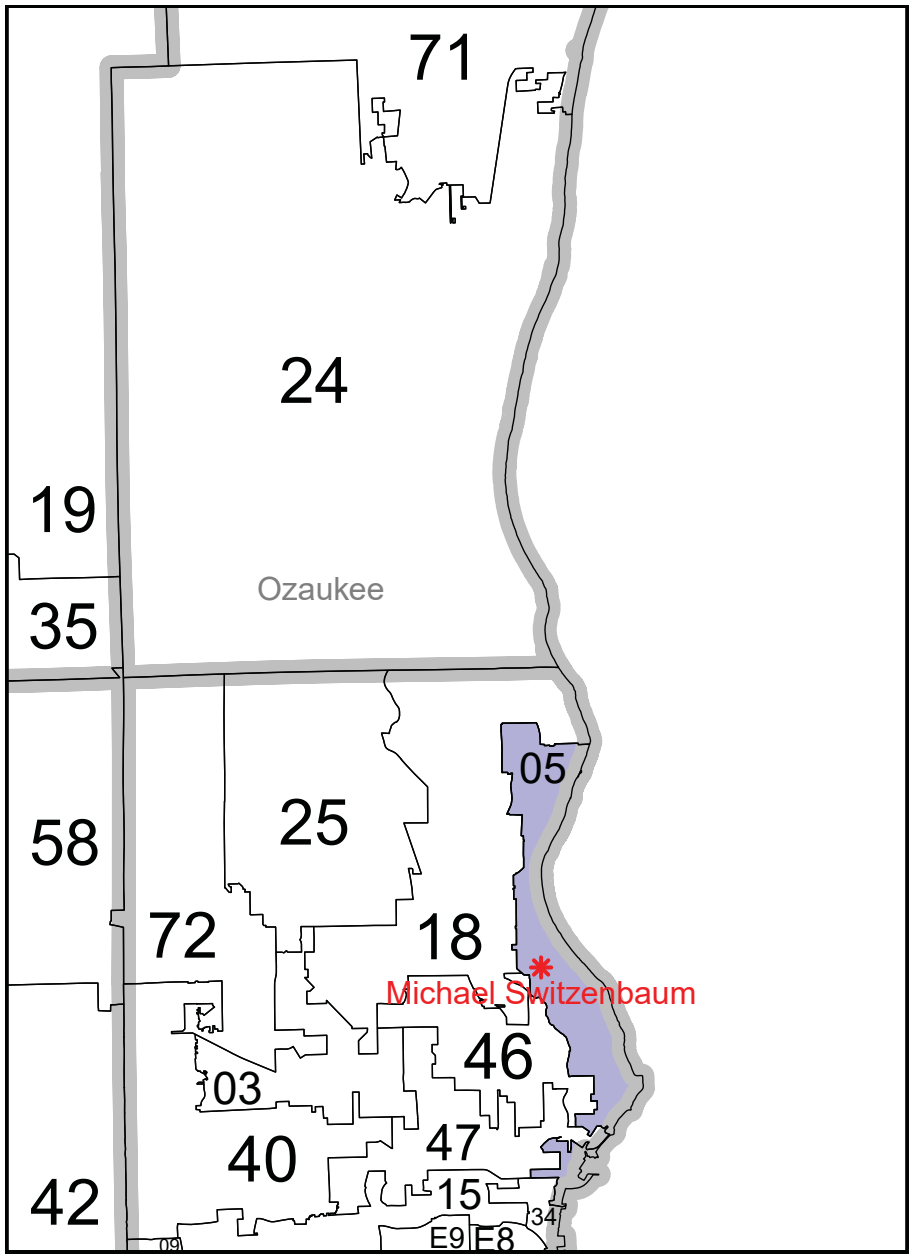
Plaintiff: Linea Sundstrom (Shorewood, WI)
District 5 of Simulated Plan 43995
(37.05% Republican Vote Share)



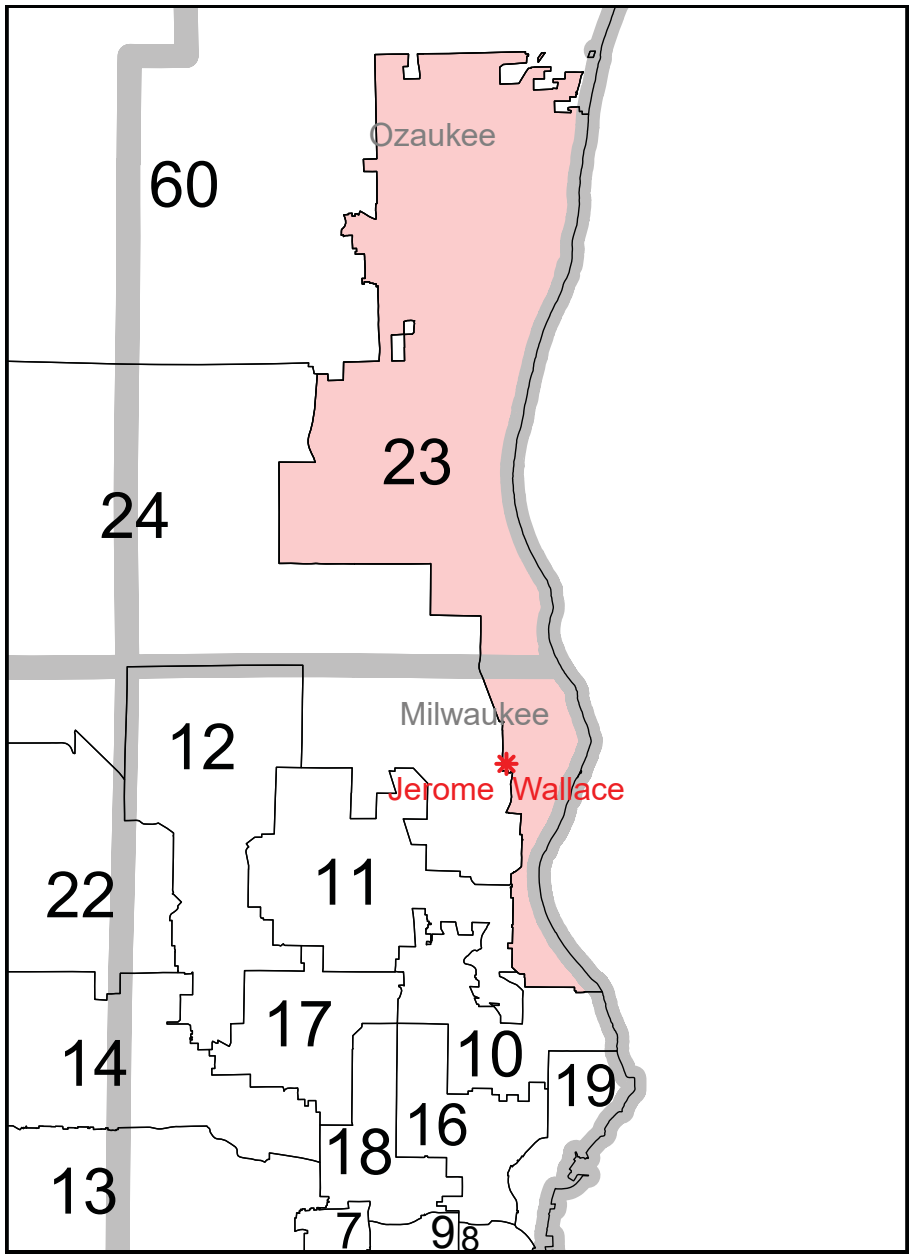
Plaintiff: Michael Switzenbaum (Whitefish Bay, WI)
District 23 of Act 43 Assembly Plan
(57.01% Republican Vote Share)



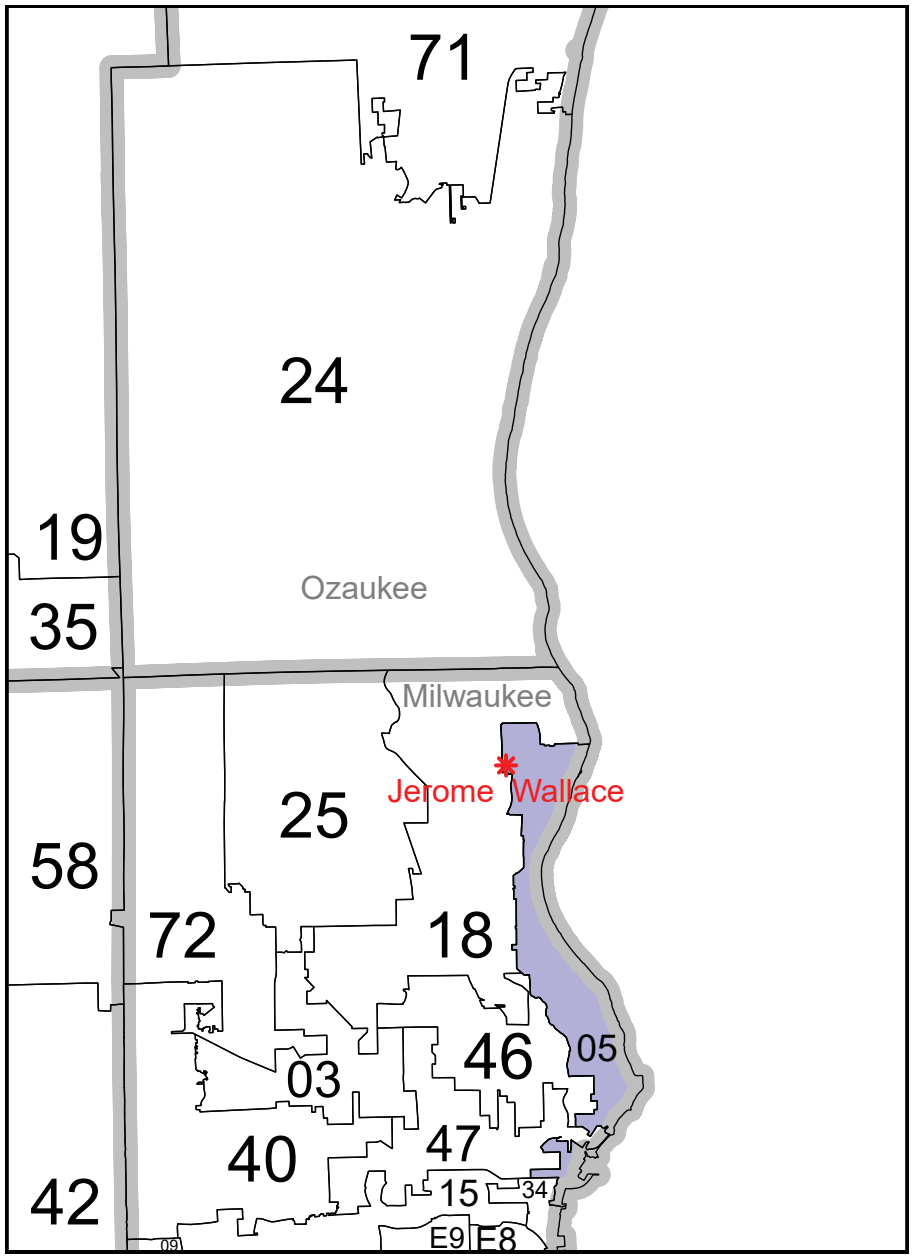
Plaintiff: Michael Switzenbaum (Whitefish Bay, WI)
District 5 of Simulated Plan 43995
(37.05% Republican Vote Share)



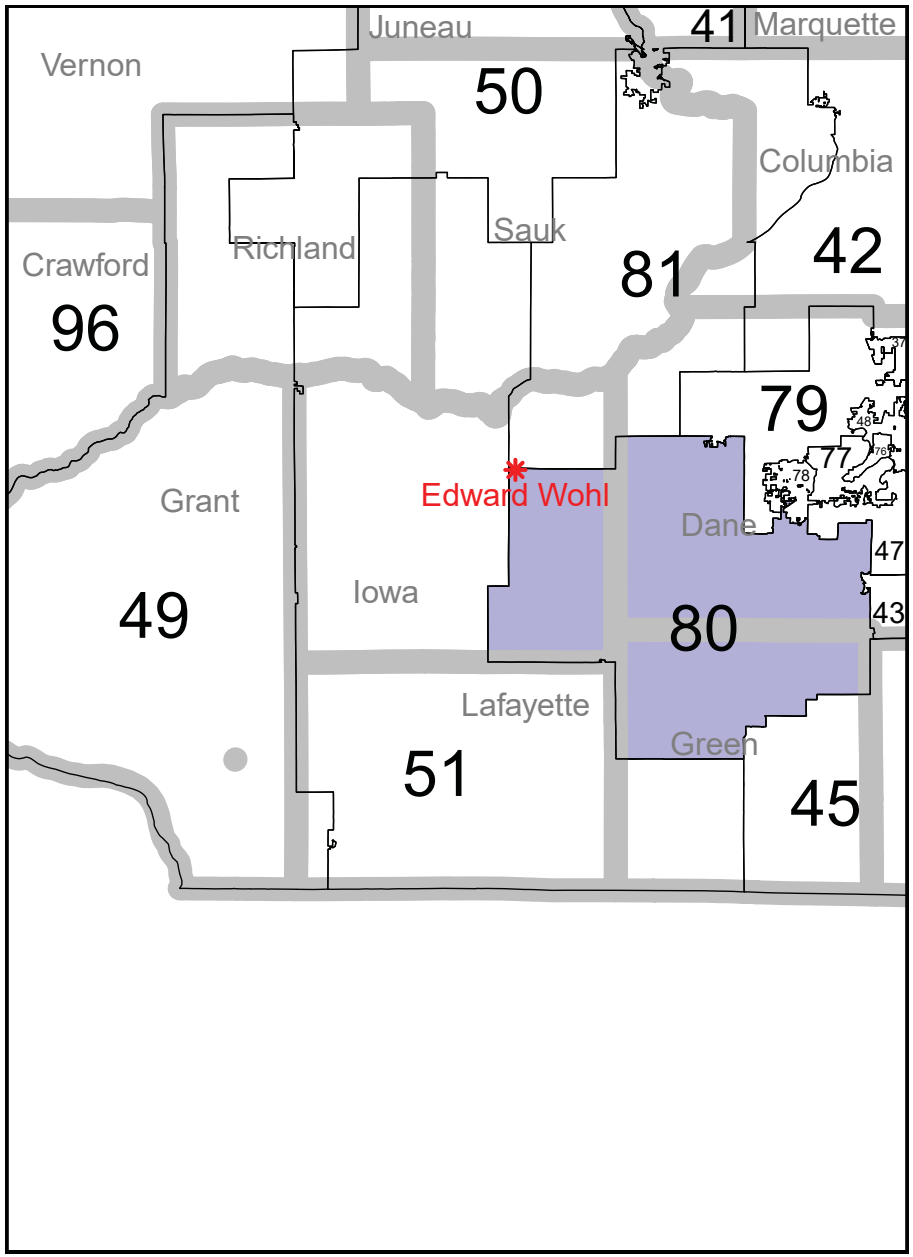
Plaintiff: Jerome Wallace (Fox Point, WI)
District 23 of Act 43 Assembly Plan
(57.01% Republican Vote Share)



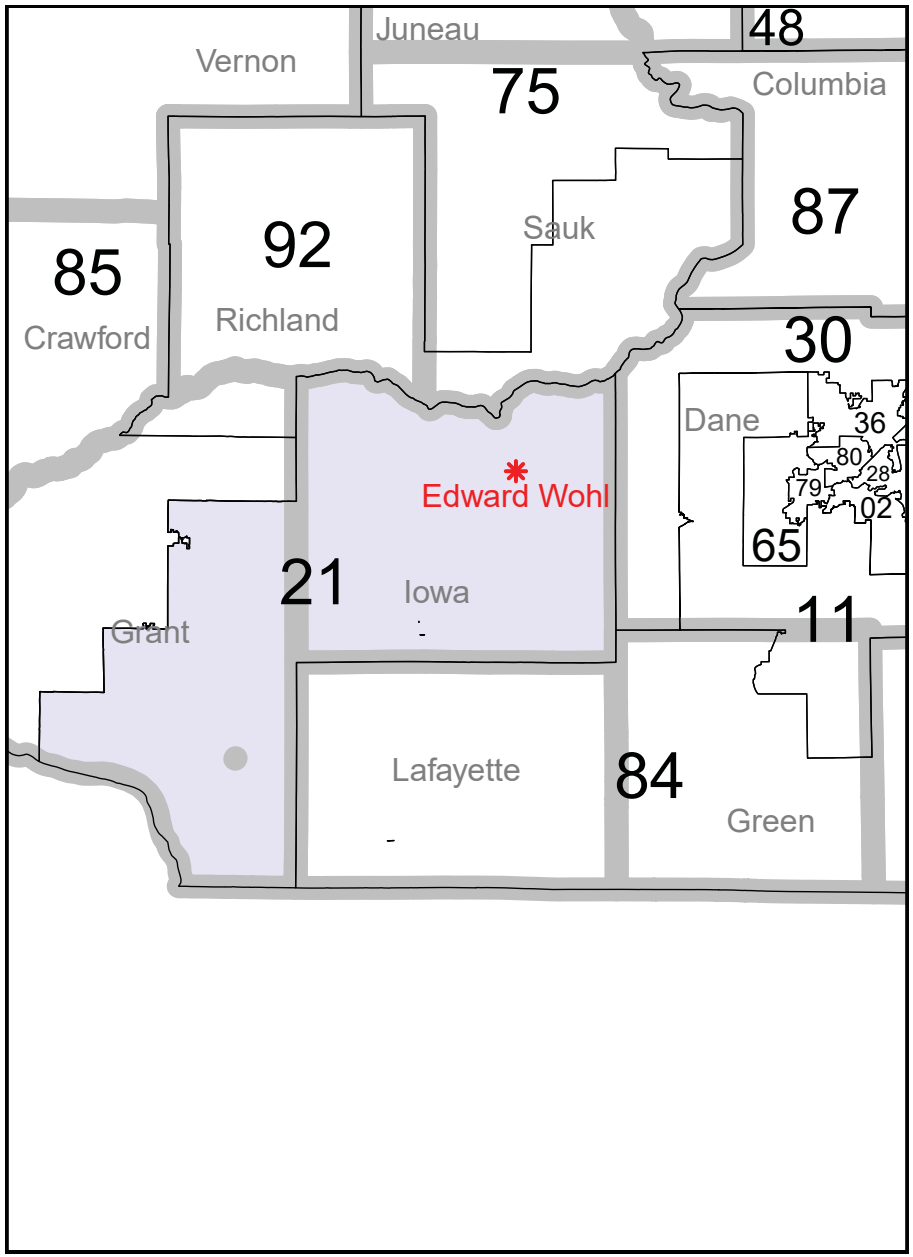
Plaintiff: Jerome Wallace (Fox Point, WI)
District 5 of Simulated Plan 43995
(37.05% Republican Vote Share)



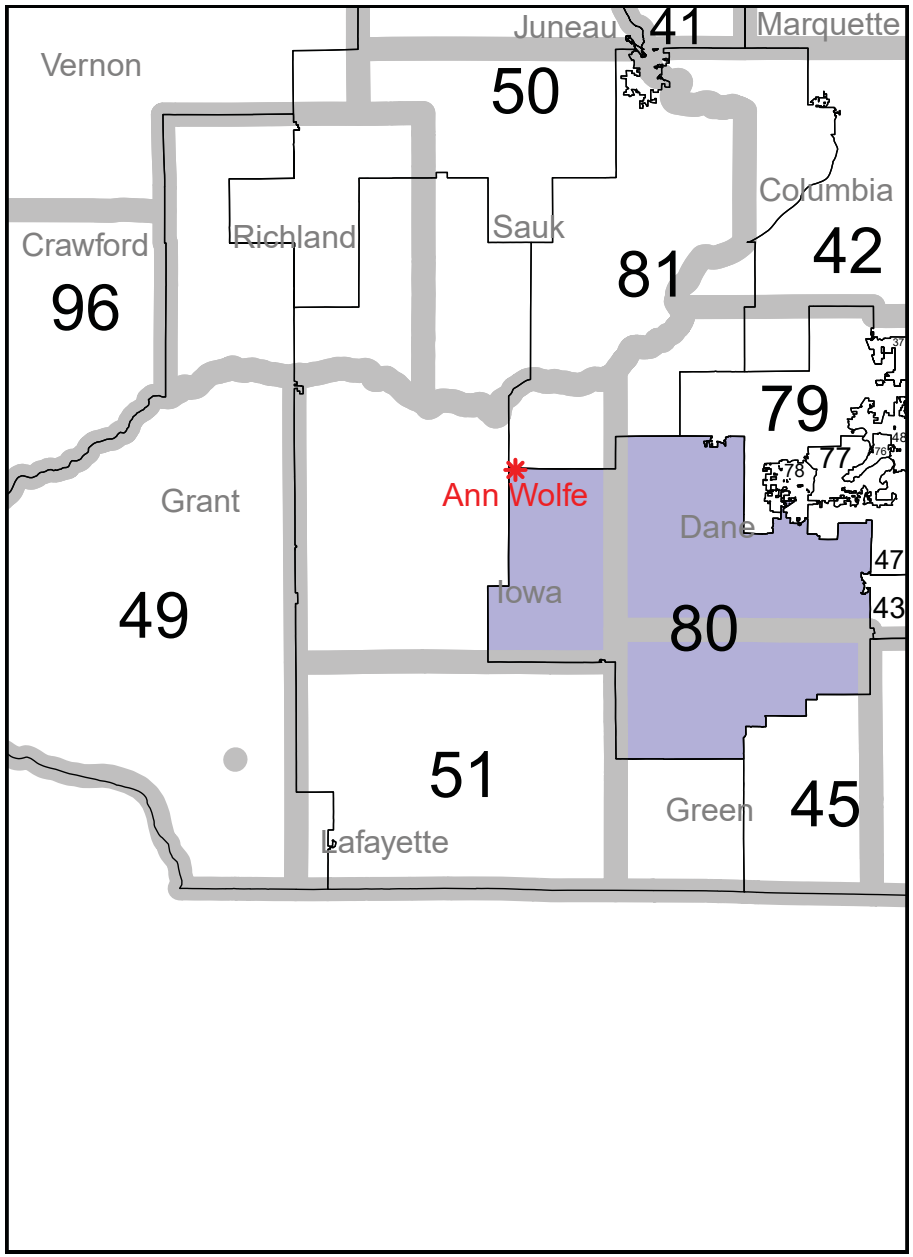
Plaintiff: Edward Wohl (Ridgeway, WI)
District 80 of Act 43 Assembly Plan
(39.21% Republican Vote Share)



Plaintiff: Edward Wohl (Ridgeway, WI)
District 21 of Simulated Plan 43995
(45.39% Republican Vote Share)



Plaintiff: Ann Wolfe (Ridgeway, WI)
District 80 of Act 43 Assembly Plan
(39.21% Republican Vote Share)



Plaintiff: Ann Wolfe (Ridgeway, WI)
District 21 of Simulated Plan 43995
(45.39% Republican Vote Share)