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**REPORT OF THE COURT-APPOINTED CO-CONSULTANTS IN RE *CLARKE v. WISCONSIN ELECTIONS COMMISSION* (Case Number 2023AP1399-OA, 2023 WI 79)**

## I. Background and Terms of the Consultant Appointment

The Court's Order of December 22, 2023 (No. 2023AP1399-OA) appointed Bernard Grofman and Jonathan Cervas as co-consultants to the Court.[1] Shortly thereafter we filed with the Court our agreement to the terms of service, and affirmed to the court that we had no conflict of interest that would interfere with our performing in a non-partisan fashion the tasks assigned to us by the Court.

We have set out the terms of our appointment below.

**Period of engagement** – The term of this agreement commenced on December 22, 2023, and will continue until there is a final opinion of this court ordering a map to be implemented. This agreement may be extended past that point if needed to complete a final documentation of the map

[1] Grofman, Distinguished Research Professor of Political Science at the University of California, Irvine, has within the past decade served as a special master or senior consultant to several state and federal courts, including congressional and legislative redistricting cases in Virginia, North Carolina and New York, and cases involving local jurisdictions in Georgia, Utah, and Virginia. Previously he had worked as an expert witness or consultant to both Republican and Democratic organizations, as well as to the NAACP and the Voting Rights Section of the U.S. Department of Justice. He has over 400 published articles, book chapters and research notes, along with 6 co-authored books and over 20 co-edited books, with an extensive corpus of research on topics such as redistricting, voting rights, and comparative electoral rules. His work has been cited by members of the U.S. Supreme Court in around a dozen cases over a period of four decades. In 2010 he received an honorary Ph.D. from the University of Copenhagen for his work on electoral systems.

Cervas, Assistant Teaching Professor beginning in Fall 2024, Carnegie Mellon Institute for Strategy and Technology, Carnegie Mellon University, has served as a special master or assistant to the special master for both state and federal courts. His work for courts has included congressional and legislative redistricting cases in Virginia and New York, as well as involvement in local jurisdiction cases in Georgia and Utah. Cervas also served as a neutral, non-partisan redistricting consultant for the 2021 Pennsylvania Reapportionment Commission, which was responsible for drawing the state's House of Representatives and State Senate maps. This plan received a bipartisan vote and was affirmed unanimously by the Pennsylvania Supreme Court. Additionally, Cervas has published in peer-reviewed journals on topics related to redistricting and electoral rules.

in form for its use for elections in the state, and to allow time for the submission of time sheets and any other requested documents.

**Conflicts of Interest** – We have no conflicts of interest in this matter and will provide non-politically motivated, independent, data-driven analysis (and, if and as requested by the Court, opinions based on our expertise) without bias or outside influence.

**Scope of work** – We are committed to providing data and analyses as requested by the Court which may assist in their deliberations. We have reviewed maps and other materials in the Court record, as submitted by the parties involved in this case or by other entities or individuals from whom the Court has accepted filings. If requested by the Court, we will undertake to make any corrections or improvements to those maps as directed by the Court.

**Confidentiality** – We agree that we will keep any communications with members of the Court confidential and never disclose the contents of any discussion with members of the Court unless and until given permission by the Court. We do, however, retain the right to use publicly available maps, documents, and data for our own subsequent research use as academic scholars. We have had no contact with the parties in this matter, their attorneys, or the experts retained by the parties other than through service of materials filed with the court. However, we have permission to discuss this case and our analysis and opinions with those serving as assistants to our own work.

**Initial submission to the Court** – On December 26, we submitted a letter to the Court (at clerk@wicourts.gov) identifying the technical specifications and necessary data that should be submitted with each of the parties' or intervenors proposed remedial maps and supporting materials. That memo was shared with the parties.

**Written Report** – We were directed to provide a written report by February 1, 2024. This document is the written report. This report, along with any supporting documents has been compiled as a .PDF document and emailed to clerk@wicourts.gov. Dr. Jonathan Cervas and Dr. Bernard Grofman have worked very closely with each other in the preparation of this Report and supporting materials and the data analysis therein reflect their joint work.

**Final plan** – When a final plan has been chosen by the Court, we will review its form and documentation to ensure that it is ready for use by state election authorities.

## II. Overview of Mapping Data and Analyses (Assembly and Senate maps)

We have conducted data-driven analysis of six remedial plans submitted to the Court by parties to this litigation or intervenors. For comparison purposes we also include analyses of the 2022 map found unconstitutional. As of this writing, no "new maps are enacted through the legislative process" (*Clarke* at ¶4, p.6). In this report, a "plan" is a set of "maps" (Assembly and Senate).[2]

The six plans and current plan we report on here are:

1. Clarke Petitioners[3] (Clarke)
2. Governor Evers (Governor)

[2] The requirement that "Assembly districts must be 'nested' within a senate district" (*Clarke* footnote 27, p.45) necessitates the creation of a plan made up of both the Assembly and Senate (or a plan with the proposed Senate or Assembly map as the starting point of the other map which would have to likewise be adopted).

[3] Petitioners Rebecca Clarke, Ruben Anthony, Terry Dawson, Dana Glasstein, Ann Groves-Lloyd, Carl Hujet, Jerry Iverson, Tia Johnson, Angie Kirst, Selika Lawton, Fabian Maldonado, Annemarie Mcclellan, James Mcnett, Brittany Muriello, Ela Joosten (Pari) Schils, Nathaniel Slack, Mary Smith-Johnson, Denise (Dee) Sweet, and Gabrielle Young.

3. Johnson Intervenors-Respondents[4] (Johnson)
4. Respondents Senators Carpenter, Larson, Spreitzer, Hesselbein, and Smith (Democratic Senators)
5. The Wisconsin Legislature[5] (Legislature)
6. Wright Intervenors[6] (Wright)
7. 2022 baseline map (Current)

## III. CRITERIA ANALYZED

In our analyses we have reviewed the plan characteristics described in data reports submitted by the parties (or their experts) for each of the six submitted plans (and the plan found unconstitutional) based on the factors identified in the Court Opinion. In the key analyses reported below, however, we provide a variety of numerical metrics that are standard in the social science literature on redistricting that we have calculated on our own directly from the mapping configurations given to us by the parties, so as to be able to present to the Court information about each of the maps in a fashion that is comparable across the various plans and that is done in a fashion that is in accord with the Court Opinion and the Court orders. In our presentation of this data, we have matched our analyses to the seven factors identified in the Court opinion and Court orders. Later in the Report we indicate exactly how each metric is defined and operationalized and what data were used in the analyses. The criteria of the court include:

A. compliance with population equality requirements." *Clarke* ¶64 at p.43;
B. the extent to which individual districts are bounded by county, precinct, town, or ward lines ("the extent to which assembly districts split counties, towns, and wards") *Clarke* ¶66 at p.45;
C. the extent to which districts are composed of contiguous territory ("for a district to be composed of contiguous territory, its territory must be touching such that one could travel from one point in the district to any other point in the district without crossing district lines") *Clarke* ¶66 at p.45;
D. the extent to which district are drawn in as compact form as practicable" *Clarke* ¶65 at p.44;
E. the extent which districts "comply with the Equal Protection Clause and the Voting Rights Act of 1965" *Clarke* ¶67 at p.46;
F. the extent to which districts are "preserving communities of interest" *Clarke* ¶68 at p.46; and
G. the extent to which a plan satisfies "political neutrality" *Clarke* ¶70 at p.47. The court notes, however, that "consideration of partisan impact will not supersede constitutionally mandated criteria such as equal apportionment or contiguity" *Clarke* ¶71 at p.48).

Although we make some comments about the maps from a social science perspective, these should not be taken as offering any interpretation of our own of the requirements of the Wisconsin

[4] Billie Johnson, Chris Goebel, Ed Perkins, Eric O'Keefe, Joe Sanfelippo, Terry Moulton, Robert Jensen, Ron Zahn, Ruth Elmer, and Ruth Streck

[5] Senator André Jacque, Senator Tim Carpenter, Senator Rob Hutton, Senator Chris Larson, Senator Devin Lemahieu, Senator Stephen L. Nass, Senator John Jagler, Senator Mark Spreitzer, Senator Howard L. Marklein, Senator Rachael Cabral-Guevara, Senator Van H. Wanggaard, Senator Jesse L. James, Senator Romaine Robert Quinn, Senator Dianne H. Hesselbein, Senator Cory Tomczyk, Senator Jeff Smith, And Senator Chris Kapenga, in their official capacities as members of the Wisconsin Senate

[6] Nathan Atkinson, Stephen Joseph Wright, Gary Krenz, Sarah J. Hamilton, Jean-Luc Thiffeault, Somesh Jha, Joanne Kane, and Leah Dudley

Constitution. The only relevant constitutional interpretations are those of the Court in its December 22, 2023, opinion and in its order appointing us as consultants. While we believe our data summaries will be helpful to the Court in comparing plans, we would emphasize that the thresholds for what does or does not constitute compliance with any provision of the Wisconsin Constitution or statutory requirements are entirely a matter for the legal judgments of this Court.[7]

## IV. Overview of Submitted and Feasible Remedial Maps

### *A. compliance with population equality requirements*

Overall population deviation is calculated by finding the population of the largest district and subtracting the population of the smallest district, and then dividing by the ideal population. The ideal population is the total population of the state divided by the number of legislative districts. For the Assembly, the ideal population of a district is 59,532.51. For the Senate, the ideal population of a district is 178,597.5. All the submitted plans have a total population deviation less than 2%. Thus, all submitted plans appear to be in compliance with the Court's order.[8]

[7] In comparing various expert witness reports, we find there are negligible variations in the assessment of certain metrics, such as compactness scores, across different maps. These minor differences are inconsequential for the evaluation of the maps. Therefore, there are no significant factual disputes concerning the comparison of the submitted remedial maps that require resolution.

[8] We did not find it necessary to report exact population deviations by district since the overall deviation appears acceptable under the standard enunciated by Wisconsin courts, and district specific data is readily available in briefs or in appendices to several of the January 22 submissions.

**Table 1 – Overall Population Deviation**

| Plan | Smallest District | Largest District | Overall Deviation |
|---|---|---|---|
| Assembly | | | |
| *Current* | 59,312 | 59,764 | 0.8% |
| *Clarke* | 59,265 | 59,814 | 0.9% |
| *Democratic Senators* | 58,989 | 60,096 | 1.9% |
| *Governor* | 58,946 | 60,115 | 2% |
| *Johnson* | 59,250 | 59,834 | 1% |
| *Legislature* | 59,257 | 59,915 | 1.1% |
| *Wright* | 58,988 | 60,077 | 1.8% |
| Senate | | | |
| *Current* | 178,092 | 179,118 | 0.6% |
| *Clarke* | 178,121 | 179,275 | 0.6% |
| *Democratic Senators* | 177,255 | 179,683 | 1.4% |
| *Governor* | 177,313 | 179,916 | 1.5% |
| *Johnson* | 178,038 | 179,202 | 0.7% |
| *Legislature* | 178,188 | 179,067 | 0.5% |
| *Wright* | 177,550 | 179,681 | 1.2% |

*B. the extent to which assembly districts split political subdivisions*

Reducing splits in counties, towns and cities and other readily cognizable political units is a traditional good government criterion because basing maps on geographic areas/political subunits familiar to citizens, especially those which remain largely fixed (e.g., counties or towns), facilitates citizen involvement, allows for easier electoral campaigning, and can provide greater continuity in maps in different decades. However, as we have previously argued, from a social science perspective, the total numbers of pieces into which political subunits are divided is more informative than merely counting the number of units that have been split at least once.[9] In

[9] Grofman, Bernard and Cervas, Jonathan, The Terminology of Districting (March 30, 2020). Available at SSRN: http://dx.doi.org/10.2139/ssrn.3540444, p.4.

particular, increasing the number of subunit pieces allows for line drawing that can more readily increase the level of partisan bias or, in the other direction, can be used to move closer to political neutrality. Thus, this criterion must be taken in context with how subunit splits were used vis-à-vis the level of partisan bias in the created maps.

We examine counties, towns, villages, and ward splits separately.[10] The plans exhibit variation in their approach to preserving the integrity of these units. The Johnson Intervenors-Respondents' plan has the fewest total county splits (lines dividing counties into multiple districts) in both its Assembly and Senate maps (133 for the Assembly and 60 for the Senate). The Johnson Intervenors-Respondents' plan also has the fewest total town splits in both its Assembly and Senate maps (3 for the Assembly and 2 for the Senate). On the other hand, the Johnson Intervenors-Respondents' map has the greatest number of ward splits in both maps.[11]

The Legislature's proposed Assembly and Senate maps have the greatest number of total county splits among the submissions. Among submissions, the Senate map that has the fewest county splits has 60 pieces and the worst (besides the Legislature's) was the Democratic Senator Intervenor's plan, with 76. However, most of the submitted plans have similar (or identical) total county splits as the current plan.

When it comes to town splits, the Johnson Intervenors-Respondents' map again has the fewest number of total town splits, with 3 in the assembly and 2 in the Senate. The plans range from a low of 3 and a high of 34 total town splits in the Assembly and 1 and 16 total town splits in the Senate (excluding the Legislature's plan for both maps; 54 and 24, respectively).[12]

A different pattern emerges for village splits. For the Assembly, the Governor's plan preserves the most villages, with only 11 total village splits, and the Clarke plan ties the Current map in the Senate with 6 village splits. The Democratic Senator Intervenor's plan is the worst regarding this measure, with 25 Assembly village splits, and 13 (tied with the Wright plan) in the Senate. The plans range from 11 to 25 village splits in the Assembly and 6 to 13 in the Senate.

The relevant data for these political subdivision splits can be found in Tables 2 and 3.

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[10] "Municipalities include towns, cities, and villages. Although Article IV, Section 4's "bounded by" requirement refers to towns, it does not refer to city or village boundaries, or "municipal" boundaries in general. As such, consideration of municipal splits does not derive from our constitution. Nonetheless, this court has still considered the number of municipal splits when evaluating maps. See Johnson III, 401 Wis. 2d 198, ¶69." (*Clarke* p.46)

[11] The brief of the Johnson Intervenors indicated that they placed little weight on ward splits since wards are redrawn once a new map is in place. Brief in Support of Intervenors-Respondents Johnson at 13 (stating "…this Court should not consider ward splits in evaluating proposed maps"). Thus, the briefs do not agree on how important ward splits are for constitutional evaluation purposes. We would note also that the joint stipulation filed January 2, 2024, is relevant for how to count ward splits, but the assessment of the Legislature's maps and those of the Johnson Intervenors regarding ward splits are essentially unaffected by differences across the data compilations of different expert reports. The legal implications of ward splits data are for the Court to determine. The relative substantive conclusions are unchanged.

[12] It is notable that the Current plan has 16 total town splits in the Assembly and 8 in the Senate, but the new proposal from the legislature has 54 for the Assembly and 24 for the Senate.

**Table 2 – Political Subdivision Splits (Counties, Towns, and Wards)**[13]

| Assembly | Counties Split | Total County Splits | Towns Split | Total Town Splits | Wards Split | Total Ward Splits |
|---|---|---|---|---|---|---|
| *Current* | 53 | 159 | 16 | 16 | **0** | **0** |
| *Clarke* | 44 | 152 | 10 | 13 | 1 | 1 |
| *Democratic Senators* | 51 | 155 | 27 | 34 | 2 | 2 |
| *Governor* | 45 | 149 | 22 | 26 | 4 | 4 |
| *Johnson* | **37** | **133** | **1** | **3** | 12 | 12 |
| *Legislature* | 53 | 159 | 49 | 54 | 105 | 107 |
| *Wright* | 47 | 153 | 14 | 16 | **0** | **0** |
| | | | | | | |
| **Senate** | **Counties Split** | **Total County Splits** | **Towns Split** | **Total Town Splits** | **Wards Split** | **Total Ward Splits** |
| *Current* | 42 | 73 | 8 | 8 | **0** | **0** |
| *Clarke* | 34 | 73 | 6 | 7 | 1 | 1 |
| *Democratic Senators* | 42 | 76 | 16 | 17 | 1 | 1 |
| *Governor* | 33 | 68 | 12 | 12 | 2 | 2 |
| *Johnson* | **29** | **60** | **1** | **2** | 9 | 9 |
| *Legislature* | 42 | 73 | 24 | 24 | 53 | 53 |
| *Wright* | 37 | 74 | 8 | 10 | **0** | **0** |

[13] There are slight differences in the reported number of subdivision splits between experts and briefs. Substantive evaluations of plans are unaffected by these minor differences.

**Table 3 – Political Subdivision Splits (Municipalities and Villages)**

| Assembly | Municipalities Split | Total Municipal Splits | Villages Split | Total Village Splits |
|---|---|---|---|---|
| *Current* | 52 | 83 | 11 | 12 |
| *Clarke* | 45 | 77 | 12 | 12 |
| *Democratic Senators* | 72 | 119 | 20 | 25 |
| *Governor* | 55 | 95 | **9** | **11** |
| *Johnson* | **37** | **72** | 13 | 14 |
| *Legislature* | 114 | 157 | 20 | 21 |
| *Wright* | 52 | 89 | 14 | 18 |
| | | | | |
| **Senate** | **Municipalities Split** | **Total Municipal Splits** | **Villages Split** | **Total Village Splits** |
| *Current* | 31 | 38 | **6** | **6** |
| *Clarke* | 29 | 38 | **6** | **6** |
| *Democratic Senators* | 48 | 60 | 12 | 13 |
| *Governor* | 33 | 46 | 8 | 8 |
| *Johnson* | **25** | **36** | 10 | 10 |
| *Legislature* | 65 | 74 | 11 | 11 |
| *Wright* | 34 | 52 | 11 | 13 |

Note: Municipalities are the sum of cities, towns, and villages splits. We do not report city splits, but they can be calculated by subtracting town and village splits from municipality splits.

1. Tradeoffs between county, town, and ward splits

The Johnson plan only divides one town in both its Assembly map and Senate map. That town, Madison, is split three ways in the Assembly and two ways in the Senate.[14] Moreover, the Johnson plan has the fewest counties that are split and the total number of splits in counties (37 counties split a total of 133 times in the Assembly, 29 split a total of 60 times in the Senate). However, aside from the Legislature's plan, it splits more wards than any of the other submissions. Both the Legislature (Legislature Br. 40-42) and the Johnson Intervenors (Johnson Br. 13-14) have advanced legal arguments that ward splits are irrelevant. It is for the court to determine what the law and constitution require. But we would point out that the other plans might reduce their county or town splits (and other municipalities) by increasing their ward splits since they, unlike the Johnston plaintiffs and the Legislature, took literally the requirement that ward, along with town and counties *must* be used as district boundaries.[15] Of course the relative priority of these different types of splits is a legal judgment that can only be made by the court.

*C. the extent to which districts are composed of contiguous territory*

The Wright petitioners in their January 22 filings (Appendix, p.4, Table 1) assert that there still were errors of contiguity remaining in three of the six submitted plans: the Legislature's plan, the Johnson plan, and the Democratic Senators plan. In our own analyses of contiguity, we cannot identify the issue in the Legislature's plan or the Johnson plan. While we do see that there are a

[14] This town apparently no longer exists. See Response Brief of Petitioners Clarke at p.7.

[15] See *Clarke* at ¶11.

number of what appear to be technical contiguity issues in the Democratic Senators' plan, after making the requisite technical corrections, we find no difference in the plan metrics. The reasons for the differences between our evaluation of contiguity compliance and those of the Wright intervenors are unknown, but nonetheless, all six of the submitted plans, with technical corrections, appear to satisfy contiguity requirements. We decline to make these corrections and will work with the parties and the court to ensure any adopted map fully complies with the Wisconsin constitution. We leave these technical corrections to the litigants since choices may have other implications for degree of satisfaction of court-designated criteria.

### *D. compactness*

Compactness usually refers to the geographic appearance of a district. As is well-known, the original gerrymander was ridiculed because of its irregular shape (and viewed as political manipulation). Here we evaluated data for the two standard measures of compactness, *Reock* and *Polsby Popper*. The Reock measure and the Polsby-Popper measure refer, on the one hand, to the degree to which the district borders are not close to the geographic center of the district, and on the other hand, to the degree of irregularity in the border of a district.[16] Both of these measures are specified relative to that of the area of a circle. The Polsby-Popper measure looks at perimeter irregularity by examining the perimeter of the district compared to that of a circle with the same perimeter, while the Reock measure compares the area of a district with that of the district's circumscribing circle.

All the submitted plans have very similar compactness scores on these two standard measures. From a social science perspective these differences are not large enough to be of substantive significance. It follows that all six of the submitted plans appear to satisfy the compactness requirement. Of course, here, too, the issues of constitutional threshold, is a matter for the Court.

### *E. equal protection and voting rights issues*

All the submitted maps have identical or similar numbers of districts (8 or 9) where African Americans or Hispanics or a combination of the two constitute a majority of the electorate. Several of the maps have kept the districts which are potentially implicated by the Voting Rights Act identical or nearly identical to how they are found in the current plan. It does not appear that we can differentiate among the submitted maps in terms of compliance with equal protection and/or the Voting Rights Act.

### *F. communities of interest*

Several of the briefs either in this or the earlier phase of litigation have offered analyses of communities of interest, sometimes with expert witness testimony. Most of these deal with claims that particular counties should be kept together because of various sorts of social, cultural, or economic ties. These types of claims are hard to evaluate and may be disguised ways of justifying plan elements that have a partisan or incumbent protection motive. Also, based on the data provided by the Wright intervenors in appendices to their January 22 brief, we found it hard to clearly differentiate among plans on grounds such as maintenance of television media markets (Table 11) or consistency of plan borders with those of school catchment areas (Table 10).

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[16] For a general overview of compactness measures see Niemi, Richard G., Bernard Grofman, Carl Carlucci, and Thomas Hofeller. 1990. Measuring compactness and the role of a compactness standard in a test for partisan and racial gerrymandering. *Journal of Politics*, 52(4):1155-1181.

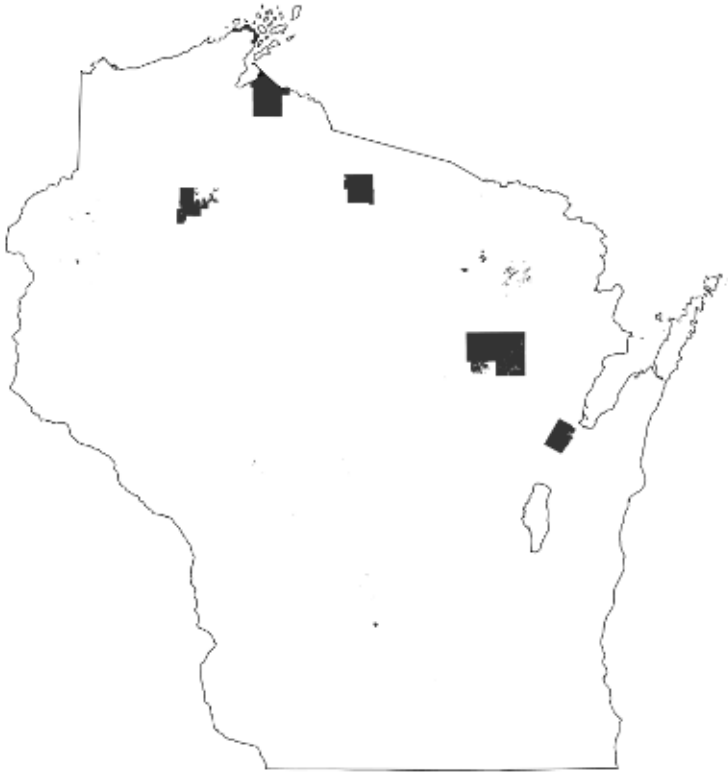
We noted a particular analysis related to communities of interest in the appendix of the Wright's brief dated January 22, specifically Table 9. This section highlighted the handling of Native American reservations in different plans. The US Census Bureau gathers information on Native American populations, encompassing both federally and state-recognized tribes. Additionally, they provide geographical data pinpointing tribal lands.[17] Consequently, Native Americans represent a distinct, cognizable, and geographically definable community of interest. The extent to which these communities are maintained within electoral districts for representation can be quantitatively assessed.

The Wright plan stood out in terms of the number of reservation splits in terms of total pieces. But it is our belief that any of the plans could potentially be adjusted to improve by retaining Native American tribal reservations at least somewhat wholly within individual districts. Although that population is sometimes dispersed, including a non-trivial proportion in urban areas, there are 21 Native American reservations and land trusts, mostly in the Northern and Eastern portion of the state. 11 of these are federally recognized reservations.[18]

[17] These can be downloaded from the US Census website at:
https://www2.census.gov/geo/tiger/TIGER2020PL/STATE/55_WISCONSIN/55/tl_2020_55_aiannh20.zip

[18] Forest County Potawatomi Community, Sokaogon Chippewa Community, Menominee Reservation, Stockbridge Munsee Community, Lac Courte Oreilles Reservation, Bad River Reservation, Lac du Flambeau Reservation, Red Cliff Reservation, Oneida (WI) Reservation, St. Croix Reservation, Ho-Chunk Nation Reservation.

**Figure 1 – Native American Tribal Area**



Note: See the US Census Bureau for more information about AIANNAH communities at https://www.census.gov/programs-surveys/geography/technical-documentation/records-layout/2020-aiannh-record-layout.html

*G. political neutrality*

We examine thirteen recent statewide elections across four electoral cycles, 2016 to 2022.[19] Our choice of elections come from the data the legislature provided, including all the elections where there was a Democrat and a Republican.[20] The elections include the 2016 and 2020 Presidential elections, the 2018 and 2022 Attorneys General, Governor's, Secretary of State, and Treasurer elections, and the 2016, 2018, and 2022 US Senate elections. There were nine elections where the statewide vote majority was Democratic, and four where the statewide vote majority

[19] We follow a best practices rule for using so-called *exogenous elections* to project results into proposed or actual districts, namely (a) only look at recent data, here 2016-2022 (b) only look at contests that are of the same general type, i.e., partisan contests for political office; (c) if racial gerrymandering is at issue, focus on biracial elections and pay attention to the two stage nature of electoral processes involving both a primary and a general election, since a minority candidate must win at both levels. In general, more elections are preferred to fewer elections but there is a tradeoff between election suitability in terms of best practices and number of elections chosen for inclusion in the analyses.

[20] Election data we use comes from the materials submitted by the legislative intervenors. The file was named "TIGER2020_PL20_StateElec16to23.gdb". We verified the data by comparing the 2020 Presidential election with data found on Dave's Redistricting App and found the data to match identically.

was Republicans.[21] Wisconsin is a very competitive state but with a slight Democratic majority in statewide elections. Indeed, across these 13 elections, the average two party vote was 50.8% for the Democratic candidates and 49.2% for the Republican candidates. In our analysis of 13 elections, we observed that each party achieved at least one victory in the races for President, Treasurer, and US Senate. In the contests for Governor, Secretary of State, and Attorneys General, Democratic candidates prevailed in all six elections.

It is a fundamental principle that the outcome of an election within a district is determined by the votes cast in that district for that particular election. However, when statewide votes are carefully selected and reaggregated into proposed districts according to best practices, they serve as valuable indicators of general partisan tendencies. This nuanced approach facilitates the evaluation of proposed electoral maps in terms of their ability to maintain political neutrality. We are not trying to predict the outcome of elections that have not yet happened, but to show how the arrangement of voters into constituencies in different ways in different plans biases or does not bias the likelihood that the majoritarian principle will be satisfied. Our analysis is about comparing maps/plans.[22]

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[21] If we are projecting state-wide elections into actual or potential legislative districts, whether to include partisan contests at the federal level for the president and for the US Senate is a judgment call. We have reported five such elections in our set of 13, to have a larger set of elections about which to compare results. After reviewing the data, we do not believe the inclusion or exclusion of these elections would change the implications about degree of compliance with majoritarianism of the various proposed remedial maps reported in the above footnote. It is important to note that results of various metrics can be sensitive to the particular elections one examines. To avoid placing undue reliance on a particular election, whose results might in principle be idiosyncratic, we have examined data for 13 recent elections.

[22] The array of election outcomes across the 13 analyzed races reveals diverse statewide vote shares for each party. This diversity arises from a complex interplay of factors, including shifts in the electorate's composition driven by variations in voter turnout, demographic transitions such as new voters reaching voting age or the passing of older voters, fluctuations in voter sentiment towards candidates and parties, and other unique influences. Moreover, the inclusion of voters' capacity to select candidates from different parties across various elections, even within the same electoral cycle, underscores the dynamic and multifaceted nature of political alignment. This cross-party voting behavior challenges the notion of immutable party loyalty, highlighting the electorate's discerning nature.

By anchoring our assessment of political neutrality in the analysis of majoritarian outcomes, we acknowledge the inherent fluidity of political affiliations and preferences, moving away from assumptions of a static political landscape. An important measure of a fair electoral plan's efficacy is its responsiveness to changes in the voting landscape. As a party or candidate's vote share increases, the number of districts in which they secure a majority should correspondingly rise. Electoral plans demonstrating this property of responsiveness—where an increase in a candidate or party's vote share leads to an increase in the number of seats won—align with the principle of representing the changing dynamics of voter sentiment. Such responsiveness ensures that electoral maps remain reflective of the electorate's will, adapting to shifts in political landscapes and voter behavior.

**Table 4 – Statewide Elections Used to Determine Political Neutrality**

| Election | Democratic Vote | Republican Vote |
|---|---|---|
| President 2020 | 50.3% | 49.7% |
| President 2016 | 49.6% | 50.4% |
| Governor 2018 | 50.6% | 49.4% |
| Governor 2022 | 51.7% | 48.3% |
| Secretary of State 2018 | 52.8% | 47.2% |
| Secretary of State 2022 | 50.1% | 49.9% |
| Treasurer 2018 | 52.1% | 47.9% |
| Treasurer 2022 | 49.2% | 50.8% |
| US Senate 2018 | 55.4% | 44.6% |
| US Senate 2016 | 48.3% | 51.7% |
| US Senate 2022 | 49.5% | 50.5% |
| Attorneys General 2018 | 50.3% | 49.7% |
| Attorneys General 2022 | 50.7% | 49.3% |
| **Average** | **50.8%** | **49.2%** |

The social science literature has several different metrics to measure deviation from political neutrality/assess the extent of partisan gerrymandering.[23] Here we focus on three measures that can be thought of as addressing the majoritarian criterion that, in a two-party competition[24], the party with the higher share of the vote should be expected to win more seats than the party with a lower share of the vote.[25] Perhaps the two best known of these majoritarian approaches are:

[23] The Legislature and the Johnson Intervenors have proposed definitions and operationalizations of gerrymandering that are different from those proposed by all other parties and Amici and differ from the majoritarian approach of the consultants. It is for the Court to resolve the legal issue of what metrics of gerrymandering provide information relevant to Wisconsin specific adjudication.

[24] We focus on the top two leading candidates/party and convert all election percentages to a two-party vote.

[25] One unfortunate confusion in the literature on redistricting is the notion that metrics intended to tap compliance with the majoritarian criterion are simply a proxy for a proportional representation standard. It is well recognized that two-party elections conducted under plurality voting in single seat constituencies cannot be expected to yield proportionality. See Grofman, Bernard. 1982. For single-member districts,

*mean minus median gap* – this is the difference between the average vote share in each district and the vote share for that same party in the median district using two-party vote. Symmetric districting plans result in a mean-median gap of 0, indicating no skew in the data. When this gap exists, there is an asymmetry between the parties in translating their vote into seats. A variant of this type of gap is the *tipping point*, the difference between the vote percentage above 50% needed for the minority party to be expected to win 50% of the seats and 50%.[26]

*partisan bias* – Is the expected seat share identical between the two candidates in a hypothetical election with each candidate receiving 50% two-party vote share? *Partisan bias with respect to votes* is the (signed) difference between each party's expected seat share at a 50% vote share and a seat share of 50%. (Or, alternatively, in a hypothetical with each of two parties having a 50% two-party seat share, is the expected vote share to generate that seat share non-identical between the two parties? *Partisan bias with respect to seats* is now the (signed) difference between each party's expected vote share at a 50% seat share and 50%.)

A third measure is not yet as well known, but it has origins in the academic literature on representation going back at least as far as 1981.[27] It directly relates to the candidate or party who receives the majority of the votes also winning the office or chamber. But most importantly, the US Supreme Court also enunciated this principle in its seminal redistricting case in 1964, *Reynolds v. Sims* (stating that "Logically, in a society ostensibly grounded on representative government, it would seem reasonable that a majority of the people of a State could elect a majority of that State's legislators." 377 U.S. 533). Of the three measures we provide data on below, it is arguably the most straightforward way of examining agreement with majoritarianism.

*majoritarian concordance*. If we calculate the number of votes for each candidate in statewide races for each legislative district, we can determine if, in a legislative plan, the party that garnered the most statewide votes also won the most legislative districts. If we do this for many elections, we can determine what proportion of these elections for each plan the party whose candidate wins most two-party votes also finds itself in a legislative majority. We can also

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random is not equal. In Bernard Grofman, Arend Lijphart, Robert McKay and Howard Scarrow (Eds.), Representation and Redistricting Issues, Lexington, MA: Lexington Books,55-58; Grofman, Bernard and Gary King. 2007. Partisan Symmetry and the Test for Gerrymandering Claims after *LULAC v. Perry*. Election Law Journal, 6 (1). (Discussing the *partisan bias* standard and why it is not a requirement for proportional representation.) As noted above, the criteria for political neutrality we make use of are NOT indices of proportionality except that an exactly 50% vote share should translate (in a two-party election) into a 50% seat share.

[26] Data on *tipping point* calculations for the six potential remedial plans in Wisconsin (and for some older plans) are presented in a faculty blog by Law School Research Fellow John Johnson of Marquette University Law School, published on-line on January 14, 2024. https://law.marquette.edu/facultyblog/2024/01/analysis-of-proposed-legislative-redistricting-plans-submitted-to-the-wisconsin-supreme-court/ The tipping point data analyses in that blog reinforces the conclusion we independently reached from our own analyses that both the Legislature's submitted remedial plan and that of the Johnson intervenors should be characterized as partisan gerrymanders. Using a composite set of elections, Johnson finds the tipping point to be 16.3 in a pro-Republican direction in the Legislatures' Assembly map, while it is 11.6 in a pro-Republican direction in the Assembly map of the Johnson intervenors. These values compare to a mean of 4.3 in the other for proposed Assembly maps. Similarly, the Legislatures' proposed Senate map has a tipping point of 15.7, and the Johnson Intervenors Senate proposed map is 13.2. The mean of the other four submissions (absolute value since one plan favors the Democrats) is 3.4.

[27] See Grofman, Bernard N. 1981. Fair and equal representation. *Ethics*, 91:477-485.

determine if there is a partisan difference in majoritarian concordance such that there is more likely to be majoritarian concordance when a particular party wins the statewide vote as compared to the situation where the other party wins the statewide vote?

Stated more simply: how often does the party that wins the most votes win the most legislative districts in elections in each legislative districting plan? Is one party more likely than the other to win the most legislative districts when they have less votes than the other party? Exact values of metrics such as mean minus median will depend upon the specific elections, but that is why we examine 13 relevant elections so as to avoid idiosyncratic results.

1. Mean minus median gap

We find the mean minus median gap separately for each of the 13 elections in our dataset. Here we report the average of these 13 elections. Our numbers, though slightly different than those found in the Wright Response Brief (Table 28), are very similar and reflect the different elections from which we took our averages from.

**Table 5 – Mean Minus Median Gap**

| | *Current* | *Clarke* | *Dem. Sen* | *Governor* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|
| Assembly | -6.6% | -1.5% | -2.3% | -1.8% | -4.1% | -6.6% | **-1.2%** |
| Senate | -6.1% | -1.9% | **-0.4%** | -1.7% | -4.8% | -6.1% | -1.9% |

Note: Positive numbers indicate a plan favors Democrats. Most political neutral maps are bolded.

The Legislature's plan, and to a slightly lesser extent the Johnson plan, reveal significant asymmetry with respect to the mean-median gap. The Current plan has the same gap as the new proposed plan from the Legislature for both the Assembly and the Senate (**6.6%** in the Assembly and **6.1%** in the Senate). The Johnson Intervenors-Respondents' plan, while not as egregious, still exhibits asymmetry regarding the mean and median, with values of **4.1%** for the Assembly and **4.8%** for the Senate. All other plans in both chambers have mean minus median gaps not exceeding **2.3%**.

2. Partisan bias in votes

**Table 6 – Partisan Bias**

| Plan | *Current* | *Clarke* | *Dem. Sen* | *Governor* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|
| Assembly | -13.4% | -1.5% | -2.9% | -2.4% | -8.3% | -13.5% | **-1%** |
| Senate | -17.6% | -2.5% | **2.1%** | -2.5% | -12.7% | -17.6% | -3% |

Note: Positive numbers indicate a plan favors Democrats. Most political neutral maps are bolded.

The Legislature's plan, and to a slightly lesser extent the Johnson Intervenors-Respondents' plan, have extreme values with respect to *partisan bias*. In the Assembly, the Current plan has a

**13.4%** bias, favoring Republican candidates. That implies that in a tied election, Republican candidates can expect to win on average about **26** more seats than Democrats. The Legislature's proposal is slightly *more* biased, with **13.5%** bias. The Johnson Intervenors-Respondents' Assembly map has an **8.3%** bias favoring Republicans, which translates to about **16** more seats than the Democrats can expect to have with the same number of votes. In the Senate, we see a similar pattern, with the Current Senate map and the Legislature's proposed Senate map exhibiting the greatest amount of bias at **17.6%**, which would yield over **11** more seats than the Democratic candidates would receive in a tied election. The Johnson Senate map has a **12.7%** bias, which is an **8**-seat advantage for Republican candidates.

All the other maps for both the Assembly and the Senate (except for the Democratic Senators' Senate map) have a modest Republican-leaning partisan bias. The deviations from political neutrality in these maps are a significant reduction from the Current plan and are similar to values that other state courts have viewed as acceptable compliance with their state constitution regarding neither favoring nor disfavoring a particular party (though 0 bias is preferable).

3. majoritarian concordance

Recall that our data for measuring political neutrality includes thirteen recent statewide elections (See Table 4). These elections resulted in Democratic candidates securing the statewide majority vote in nine instances, while Republican candidates achieved this in the remaining four.[28] Our analysis centers on evaluating each of the thirteen elections to determine how often the party securing the statewide majority (regardless of the margin of victory) would have also captured a majority of seats under each proposed map. This metric is reported as a percentage, with a higher value indicating greater concordance. Essentially, in a democratic framework, it is preferable for the majority party to usually attain governmental control, reflecting the will of the electorate. We have deliberately used the word *usually* rather than *always*, since in a closely divided state, majoritarian reversals are possible. But majoritarianism is what is desirable from a normative and social science perspective.

[28] If we are projecting state-wide elections into actual or potential legislative districts, whether to include partisan contests at the federal level for the president and for the US Senate is a judgment call. We have reported four such elections in our set of 13, so as to have a larger set of elections about which to compare results. After reviewing the data, we do not believe the inclusion or exclusion of these elections would substantially change the implications about degree of compliance with majoritarianism of the various proposed remedial maps reported in the footnote above.

**Table 7 – Majoritarian Concordance across 13 statewide elections (Assembly)**

| Assembly | *Democratic Vote* | *Republican Vote* | *Current* | *Clarke* | *Democratic Senators* | *Governor* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|---|---|
| *US Senate 2016* | 48.3% | 51.7% | YES | YES | YES | YES | YES | YES | YES |
| *Treasurer 2022* | 49.2% | 50.8% | YES | YES | YES | YES | YES | YES | NO |
| *US Senate 2022* | 49.5% | 50.5% | YES | YES | YES | YES | YES | YES | NO |
| *President 2016* | 49.6% | 50.4% | YES | YES | YES | YES | YES | YES | YES |
| *Secretary of State 2022* | 50.1% | 49.9% | NO | YES | NO | NO | NO | NO | YES |
| *President 2020* | 50.3% | 49.7% | NO | YES | NO | NO | NO | NO | YES |
| *Attorneys General 2018* | 50.3% | 49.7% | NO | NO | NO | NO | NO | NO | NO |
| *Governor 2018* | 50.6% | 49.4% | NO | NO | NO | NO | NO | NO | NO |
| *Attorneys General 2022* | 50.7% | 49.3% | NO | YES | NO | YES | NO | NO | YES |
| *Governor 2022* | 51.7% | 48.3% | NO | YES | YES | YES | NO | NO | YES |
| *Treasurer 2018* | 52.1% | 47.9% | NO | YES | YES | YES | NO | NO | YES |
| *Secretary of State 2018* | 52.8% | 47.2% | NO | YES | YES | YES | NO | NO | YES |
| *US Senate 2018* | 55.4% | 44.6% | YES | YES | YES | YES | YES | YES | YES |
| *Majoritarian Concordance* | | | 38.5 | 84.6 | 61.5 | 69.2 | 38.5 | 38.5 | 69.2 |

Note: The table is organized so that the rows are oriented such that the election which the Republican performed the best is at the top, and where the Republican candidate performed the worst is at the bottom. The bottommost row shows the *majoritarian concordance* percentage, which is the percentage of times in the set of 13 elections that the majority vote earning party wins a majority of legislative seats in each plan.

**Table 8 – Majoritarian Concordance across 13 statewide elections (Senate)**

| Senate | *Democratic Vote* | *Republican Vote* | *Current* | *Clarke* | *Democratic Senators* | *Governor* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|---|---|
| *US Senate 2016* | 48.3% | 51.7% | YES | YES | YES | YES | YES | YES | YES |
| *Treasurer 2022* | 49.2% | 50.8% | YES | YES | NO | YES | YES | YES | YES |
| *US Senate 2022* | 49.5% | 50.5% | YES | YES | NO | YES | YES | YES | NO |
| *President 2016* | 49.6% | 50.4% | YES | YES | YES | YES | YES | YES | YES |
| *Secretary of State 2022* | 50.1% | 49.9% | NO | NO | YES | YES | NO | NO | YES |
| *President 2020* | 50.3% | 49.7% | NO | YES | YES | YES | NO | NO | YES |
| *Attorneys General 2018* | 50.3% | 49.7% | NO | NO | YES | NO | NO | NO | NO |
| *Governor 2018* | 50.6% | 49.4% | NO | NO | YES | NO | NO | NO | NO |
| *Attorneys General 2022* | 50.7% | 49.3% | NO | NO | YES | YES | NO | NO | YES |
| *Governor 2022* | 51.7% | 48.3% | NO | YES | YES | YES | NO | NO | YES |
| *Treasurer 2018* | 52.1% | 47.9% | NO | YES | YES | YES | NO | NO | NO |
| *Secretary of State 2018* | 52.8% | 47.2% | NO | YES | YES | YES | NO | NO | NO |
| *US Senate 2018* | 55.4% | 44.6% | YES | YES | YES | YES | YES | YES | YES |
| *Majoritarian Concordance* | | | 38.5 | 69.2 | 84.6 | 84.6 | 38.5 | 38.5 | 61.5 |

Note: The table is organized so that the rows are oriented such that the election which the Republican performed the best is at the top, and where the Republican candidate performed the worst is at the bottom. The bottommost row shows the *majoritarian concordance* percentage, which is the percentage of times in the set of 13 elections that the majority vote earning party wins a majority of legislative seats in each plan.

Three plans violate the majoritarian criterion, satisfying it in only 5 of 13 instances in their Assembly and Senate maps. These three plans are the Current plan, the Johnson Intervenors-Respondents' plan, and the Legislature's proposed plan. Republican candidates, when they win a majority of the votes, always receive the most seats. However, in each of these plans, when Democrats receive most of the votes, only once do they receive the majority of legislative seats (all three times is the US Senate race in 2018). This is a clear violation of the majoritarian concordance criterion.

Among the remaining sets of plans, the majoritarian concordance criteria vary slightly across chambers. The best performing map among the Assembly proposals is the Clarke map, with only two instances of the majority vote party failing to win most of the legislative districts. It performs less well in its Senate map, where the majority fails in four elections. In the Senate, the best performing maps are the Democratic Senators' map and Governor Evers map. In both maps, the majority parties win the majority of legislative districts in all but two elections (though the specific elections in which this happens are different). In the Democratic Senators' map, the two failures of majoritarianism come in elections where the Republican candidates received the most votes, and in Governor Evers' map, the two failures come in elections where the Democratic candidates win most of the votes statewide.

Since both the Assembly map and the Senate map need to be chosen together, and as such it is useful to compare the majoritarian concordance criteria jointly. We can do so by looking at the 26 elections (13 from each chamber) across each plan and determine how often the majoritarian criterion is satisfied.

**Table 9 – Majoritarian Concordance Averages**

| | *Current* | *Clarke* | *Dem. Sen* | *Governor* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|
| Assembly | 38.5 | 84.6 | 61.5 | 69.2 | 38.5 | 38.5 | 69.2 |
| Senate | 38.5 | 69.2 | 84.6 | 84.6 | 38.5 | 38.5 | 61.5 |
| Combined | **38.5%** | **76.9%** | **73.1%** | **76.9%** | **38.5%** | **38.5%** | **65.4%** |

We now see that the Clarke plan and Governor Evers plan satisfies the majoritarian criterion to the highest degree, in 20 of 26 instances. The Democratic Senators' plan, and the Wright plan perform significantly better on majoritarian concordance than the Current plan, the Legislature's plan, and the Johnson Intervenors-Respondents' plan.

However, to further understand concordance with the majoritarian criterion, it is important to distinguish between the parties.

1. Partisan differences in majoritarian concordance

As stated above, both the Legislature and the Johnson Intervenors-Respondents' plans have a majoritarian concordance in only 10 of the 26 statewide elections analyzed. In each plan, among the set of eight elections in which the Republican candidate won most statewide votes, Republicans candidates also always carried a majority of legislative districts. That is, in elections in which Republicans won a majority of the votes, majoritarian concordance was 100%. However, among the 18 elections in which the Democratic candidate won a majority of the votes, the Democratic candidates carried most of the legislative districts in just two of the elections. Therefore, the majoritarian concordance among elections where the Democratic candidate was victorious statewide, the percentage was just 11.1%. We now conduct this analysis for each of the seven plans and present the results in Table 10.

**Table 10 – Majoritarian Concordance and the Partisan Effects**

| | *Current* | *Clarke* | *Dem. Sen* | *Governor* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|
| Republican Statewide Majority | 100.0% | 100.0% | 77.8% | 100.0% | 100.0% | 100.0% | 61.1% |
| Democratic Statewide Majority | 11.1% | 66.7% | 72.2% | 66.7% | 11.1% | 11.1% | 66.7% |
| Combined | **38.5%** | **76.9%** | **73.1%** | **76.9%** | **38.5%** | **38.5%** | **65.4%** |

The differences in the plans now become clear. In most plans for most elections, when the Republican candidate wins the most votes, they win most of the legislative districts. In the Clarke, Democratic Senators, Governor Evers, and Wright proposals, when Democrats win the most votes, Democrats are likely to win the most districts. In the Legislature and Johnson proposals, they are *unlikely* to win the most districts.

In our comparison of seven plans, the Republican majoritarian concordance reaches 100% in five of them (Current, Clarke, Governor Evers, Johnson, and Legislative plans). When Republicans win most votes, the Democratic Senators' plan exhibits a 77.8% concordance, and the Wright plan shows a 61.1% concordance. Conversely, when Democrats secure the most votes, the Democratic Senators' plan leads with a 72.2% concordance rate. Three plans – Clarke, Governor Evers, and Wright – demonstrate a 66.7% concordance under the same condition. However, as mentioned earlier, three plans (Current, Johnson, and Legislature) have only an 11.1% concordance when the Democratic candidate wins most votes.

We note that some of the 13 elections we consider here were highly competitive. As we have shown in other peer-reviewed work, electoral "inversions" such as we describe here using the term majority concordance are sometimes inevitable when elections are very close.[29] Under such conditions, it is conceivable that chance fluctuations led to a partisan flip in the vicinity of the 50-50 point, but we can also look at statewide elections that are not so competitive to see if the majoritarian principle holds in such elections.

Consider the statewide election in 2018 for US Senate won by the Democratic candidate by a considerable majority (with 55.4% of the two-party vote). If the majoritarian principle held, we would expect that the Democratic winner of this contest would carry with them at least a bare majority of legislative seats when we look at Legislature's proposed remedial plan and the Johnson Intervenors-Respondents' plan (and the current plan). And for this election, each plan satisfies the majoritarian principle.

If we look at the next widest Democratic statewide majority among our 13 elections, the Democratic candidate received 52.8% of the two-party vote. Despite winning by over 5 points, the Democratic candidate for Secretary of State in 2018 failed to win the most seats in both the Legislature's proposal and the Johnson Intervenors-Respondents' plan, for both the Assembly and the Senate. As such, it fails to satisfy the majoritarian principle for these maps. The other maps analyzed here (excluding the current plan) satisfy this most coarse measure.

The widest Republican statewide victory in our 13-election set was a three-and-a-half-point victory in 2016 for US Senate. In that election, each one of the plans analyzed produced a majoritarian result. It is clear that both the Legislature's plan and the Johnson plan fail to deliver on the normatively desirable and politically neutral majoritarian criteria we have examined here. Among the remaining four plans (Clarke, Democratic Senators, Governor Evers, and Wright), there are some differences in how satisfactorily they reduce partisan bias and deliver majoritarian

[29] See our work examining presidential election inversions where the popular vote winner receives a minority of the electoral college votes. Cervas, Jonathan R., and Bernard Grofman. 2019. "Are Presidential Inversions Inevitable? Comparing Eight Counterfactual Rules for Electing the U.S. President*." Social Science Quarterly 100(4): 1322–1342. https://onlinelibrary.wiley.com/doi/10.1111/ssqu.12634. See also Geruso, Michael, Dean Spears, and Ishaana Talesara. 2022. "Inversions in US Presidential Elections: 1836–2016." American Economic Journal: Applied Economics 14(1): 327–357. https://www.aeaweb.org/articles?id=10.1257/app.20200210.

outcomes. However, they are markedly more politically neutral than the Current plan, and both the Legislature and Johnson plans. A further challenge lies in the fact that the Assembly and Senate maps must be jointly selected to satisfy nesting requirements.

**Incumbency.** Although incumbent information was included as part of the supplementary materials prepared by the parties, and a stipulation to seal this data was ordered by the court, we did not use this data nor would we unless specifically instructed to do so by the court. If the court were to ask us to consider incumbency locations, we would also require guidance from the court regarding the relative prioritization to be given incumbency protection versus the constitutionally mandated criteria. We further note that neutral treatment of incumbent pairings would, *ceteris paribus*, be expected to have more Republican incumbent pairings than Democratic incumbent pairings simply because we start with many more Republican incumbents.

**Numbering of senate districts.** Legal issues having to do with how best to renumbering of all the districts have been raised by the Wright Intervenors Petitioners. The assignment of numbers to senate districts determines which districts will be up for election in 2024 and affects potential pairings among present senate members who choose to compete in 2024. Since these are legal questions, we defer to the court for legal guidance, but were the court to request it, we could suggest neutral algorithms to handle the renumbering. Relatedly, the court may wish to consider a more geographically consistent numbering of Assembly and Senate districts.

## V. SUMMARY

1. Traditional Good Government Criteria

In terms of the good government criteria - of population equality, political subunit splits, and compactness – (except for the Legislature's plan, which has an excessive number of splits) all the plans have addressed themselves to satisfying these good government criteria. In our view, in the light of the joint data stipulation, there are no plans where there remains an issue of discontiguity that cannot be addressed by technical corrections by the Wisconsin Legislative Technology Services Bureau (LTSB).

The plans differ in terms of the priority placed on reducing subdivision splits, with the Johnson Intervenors-Respondents' plan placing emphasis on reducing county and town splits, and the Clarke and Wright plans placing their emphasis on reducing ward splits. While the plans do considerably better at reducing all subdivision splits compared to the current map, we believe it is possible to further reduce the prevalence of political subdivision splits even further while adhering to the other criteria the court has announced. Various parties have argued that ward boundaries need not be preserved because they are automatically adjusted after any redistricting and change as often as twice per year. We have no opinion on this as it is a matter of law.

**Table 11 - Bound by County, Town, or Ward Lines**

| | *Current* | *Clarke* | Democratic Senators | *Governor Evers* | *Johnson* | *Legislature* | *Wright* |
|---|---|---|---|---|---|---|---|
| Assembly | 100% | 100% | 98% | 98% | 81% | 54% | 100% |
| Senate | 100% | 100% | 94% | 100% | 64% | 48% | 100% |

Note: This table is recreated from the Appendix to Response Brief of Intervenor Petitioners Wright, App at 7, Table 3. Data is the percentage of districts bounded entirely by county, town, or ward lines.

2. Equal Protection Issues

As briefly discussed above, none of the plans appear to have equal protection issues or issues under the Voting Rights Act of 1965.

3. Communities of Interest

As discussed above, there are potential issues related to protection of the boundaries of Native American reservations in maps other than those of the Wright intervenors. The importance of those issues is, of course, for the Court to decide, but as noted above, it would be relatively straightforward to improve the performance of most plans with respect to treatment of the Native American reservations.[30]

4. Political Neutrality

**Table 12 – Summary of Political Neutrality by Plan**

| | Average Mean - Median | Average Majoritarian Concordance | Average Partisan Bias |
|---|---|---|---|
| *Current* | -6.3% | 38.5% | -15.5% |
| *Clarke* | -1.7% | **76.9%** | -2% |
| *Democratic Senators* | **-1.3%** | 73.1% | **-0.4%** |
| *Governor Evers* | -1.8% | **76.9%** | -2.5% |
| *Johnson* | -4.4% | 38.5% | -10.5% |
| *Legislature* | -6.3% | 38.5% | -15.6% |
| *Wright* | -1.5% | 65.4% | -2% |

Note: These data are averages of averages (average for each submissions' Assembly and Senate plan for each of the 13 elections). Lower absolute values of mean minus median and partisan bias mean the plan is more neutral. Higher majoritarian concordance means a plan is more politically neutral.

As documented above, from a social science perspective, the Legislative Intervenors-Respondents' plan is a partisan gerrymander as demonstrated by the three metrics of

[30] We have reviewed the claim in the Response Brief of the Legislature that the Wright Senate map splits the Oneida reservation between two Senate districts, but our numbers confirm the assertion in the Response Brief of Intervenors-Petitioners Wright Table 8 (p.25) that they only split one federally recognized reservation, the Ho-Chunk Nation.

majoritarianism and political neutrality we identified. The next most extreme deviation from majority rule was found in the maps introduced by the Johnson Intervenors-Respondents. These maps, though having a slight reduction in bias, are also so biased in partisan terms that they can clearly be labeled partisan gerrymanders in a pro-Republican direction. However, because the Johnson maps score very well on traditional good government criteria – in fact, score the best on various measures of splits of political subdivisions - we would characterize them as what we have elsewhere labeled as *stealth gerrymanders*.[31] As we have defined it, a stealth gerrymander is a plan that looks on its face to be a good map in that it satisfies to a considerable degree traditional good government criteria, but yet it exhibits an extreme level of partisan bias.

On average, each plan, including those submitted by Governor Evers, the Democratic Senators, the Clarke Petitioners, and Wright Intervenors-Respondents plans remain tilted toward the Republicans on all three of our metrics. However, Governor Evers, the Democratic Senators, the Clarke, and Wright plans do create a competitive environment such that most of the time, the party that wins the most votes will win the most seats. These plans reflect the political competitiveness of the state. Although a plan may perform best on one of the three measures for which we provide data analysis, we cannot conclude that any one of the plans is dominant when it comes to political neutrality.

It has been argued in briefs for the Legislative Intervenors-Respondents and those for the Johnson Intervenors-Respondents that the poor Democratic results for the plans they submitted are due simply to the electoral geography of Wisconsin, which acts to disadvantage parties whose electoral strength is more geographically concentrated.[32] As numerous scholars have demonstrated, both theoretically and empirically, even in states where the electoral geography favors one party, it is possible to draw plans that satisfy traditional good government but that

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[31] Cervas, Jonathan R., and Bernard Grofman. 2020. "Tools for identifying partisan gerrymandering with an application to congressional districting in Pennsylvania." *Political Geography* 76: 102069. https://linkinghub.elsevier.com/retrieve/pii/S0962629818303342.

[32] Sometimes the results of computer-generated maps (referred to as *ensembles*) are used to claim that median or modal outcome in the distribution of outcomes from set of such computer-generated maps is optimal or the natural outcome, and plans that are far from the center of this distribution indicates a plan is a gerrymander. But that is highly misleading. A median or modal outcome itself can be far from politically neutral. There is nothing that forces courts seeking political neutrality to pick a modal plan; moreover, these ensembles often fail to generate politically neutral plans that human mapmakers have relatively little difficulty in creating. As one of the leading experts on ensembles, the mathematician Moon Duchin has commented: "It is important to note that outlier status is a flag of intentionality, but not necessarily a smoking gun of wrongdoing. Being in a tails of a distribution that was created around certain design principles can often provide persuasive evidence that other principles or agendas were in play. For example, a map might be an outlier as the most compact, or the map that gives minority groups the greatest chance to elect their candidates of choice--these kinds of outlier status would not be marks of a bad plan. But being an outlier can indeed be a sign of problems, as when a plan systematically converts close voting to lopsided seat shares for the party that controls the process." Affidavit of Professor Moon Duchin, Harper v. Hall, 21 CVS 500085. December 28, 2021. https://www.nccourts.gov/assets/inline-files/PX234%20Expert%20Rebuttal%20Report%20of%20Dr.%20Moon%20Duchin.pdf?VersionId=FVXongUCJFOkqJe38b2SwSPnTL0N7wcE?FVXongUCJFOkqJe38b2SwSPnTL0N7wcE. See also Katz, Jonathan N., Gary King, and Elizabeth Rosenblatt. 2020. "Theoretical Foundations and Empirical Evaluations of Partisan Fairness in District-Based Democracies." *American Political Science Review* 114(1): 164–178 at 176.

nonetheless provide something close to political neutrality.[33]

The argument advanced that the political geography of Wisconsin makes it inevitable that Republicans will win an outsized share of the legislative districts is contradicted by the maps submitted to this court. The plan with both the best performance on traditional redistricting criteria, and the plan that performs the worst on those same measures are the two worst in terms of political neutrality. On the other hand, the Clarke, Wright, Governor's, and Democratic Senators' maps for both the Assembly and for the Senate improve on traditional good government criteria compared to the current map and manage to create plans with modest levels of partisan bias. This is compelling evidence that the geography of Wisconsin does not preclude the creation of good government maps that also seek to satisfy the goals of majority rule representation and avoiding political gerrymandering.[34]

In contrast, the Legislative Intervenors-Respondents' plan and the Johnson Intervenors-Respondents plans operate to preclude any potential for Democratic control of the legislature except in elections which the Democratic candidate does exceptionally well – well above a simple majority. That kind of insulation from the forces of electoral change is the hallmark of a gerrymander.[35]

To put it simply, in Wisconsin, geography is not destiny. The plan chosen determines whether political neutrality (and other criteria) will be served.

## VI. Conclusions

Only if the Court finds that none of the parties' submissions meet the criteria set forth in the Court's December 22, 2023, opinion were we to prepare a map of our own. Since it is only the Court that determines whether any map is in compliance with the Wisconsin Constitution and statutory law, we are not offering a plan of our own. We were free to make technical corrections in submitted plans, but we did not feel it necessary to do so.

From a social science perspective, the Legislature's plan does not deserve further

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[33] Chen, Jowei. 2017. "The Impact of Political Geography on Wisconsin Redistricting: An Analysis of Wisconsin's Act 43 Assembly Districting Plan." *Election Law Journal: Rules, Politics, and Policy* 16(4): 443–452.; McGann, Anthony J., Charles Anthony Smith, Michael Latner, and Alex Keena. 2016. Gerrymandering in America: the House of Representatives, the Supreme Court, and the future of popular sovereignty. Cambridge, United Kingdom; New York, NY, USA: Cambridge University Press.; Keena, Alex, Michael Latner, Anthony J. McGann McGann, and Charles Anthony Smith. 2021. Gerrymandering the States: Partisanship, Race, and the Transformation of American Federalism. 1st ed. Cambridge University Press.

[34] The simulations discussed in multiple briefs suggest that Democrats could secure a greater proportion of seats based on previous statewide elections than projected by any of the simulated maps. It's important to consider that this discrepancy may stem from issues within the simulation methodology rather than flaws in the map proposals being reviewed by this court. Notably, the maps under examination frequently surpass the performance of the ensemble maps in terms of traditional redistricting criteria and factors identified by this court as being important while maintaining political neutrality.

[35] As shown in the January 22 Brief of Petering at p.15, similar conclusions would be reached if we were to examine another metric that has been used in the literature on gerrymandering, the *efficiency gap*. The efficiency gap takes as its "ideal" a conversation of two percentage points of seats above 50% for every one percentage of vote share above 50% and measures deviations from that ideal. Because the efficiency gap assumes a simple linear transformation of votes into seats, we have not chosen to report it in our own Report.

consideration. Of the remaining plans, the Johnson plan appears to have a substantial number of fails of the "bounded by" constitutional criteria. We also note that both the Legislature's plan and the Johnson plan, from a social science perspective, are partisan gerrymanders. The four other submitted plans are similar on most criteria. From a social science point of view these for plans are nearly indistinguishable.

The Court can instruct us to take one or more of the plans and improve it with respect to one or more of the court-mandated criteria. Or the Court can instruct us to draw on more than one of the proposed maps and offer the Court a map intended to improve performance on most or all of the Court mandated criteria. In the process of reviewing plans, we have done extensive explorations of the geography of Wisconsin, and we are confident that we can do so. If the Court were to instruct us to create such a map, we are poised to produce it quickly.

Signature _____ Date February 1, 2024

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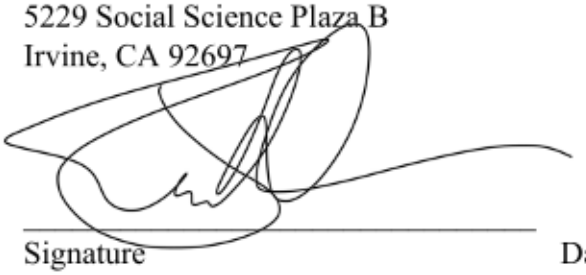

Signature _____ Date February 1, 2024

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