

The Predominance Test: A Judicially Manageable Compactness Standard for Redistricting

Michael McDonald

ABSTRACT. Scholars have proposed more than one hundred measures of district compactness to analyze legislative maps, but each of these measures lacks a critical threshold at which a district becomes suspect. To address this deficiency, this Essay proposes an analytical framework, the “Predominance Test,” that compares district compactness in a given legislative map against a near-maximally compact redistricting plan. The test has three virtues: (1) it provides a judicially manageable standard to identify when a compactness violation occurs, in a legal framework familiar to courts; (2) it can be used with any compactness measure; and (3) it evaluates compactness with respect to what is possible in a district’s geographic region. This Essay describes an application of the Predominance Test in a challenge to Virginia’s state legislative districts, where a judge accepted the test and found the evidence it produced compelling. While the Predominance Test is not a cure for gerrymandering, it can help constrain the most egregious gerrymanders.

INTRODUCTION

Representatives in the United States and around the world are selected to legislative seats by voters residing within geographically defined areas known as districts. Periodically, redistricting authorities adjust district lines to reflect population changes within districts, such that representation is equalized across districts. Redistricting—the process by which legislatures or commissions redraw legislative district boundary lines—is *prima facie* constrained by numerous constitutional and statutory criteria that are ostensibly politically neutral. Among the most widespread of these criteria is compactness, the notion that districts generally should not be oddly shaped. In practice, redistricting authorities also draw lines to gain partisan advantage, protect incumbents, and affect racial representation. Often, but not always, district shapes are contorted to achieve these political outcomes. Gerrymandering occurs when redistricting authorities give

greater weight to these political goals than to the required constitutional and statutory criteria.

Gerrymandering leads to distortions in representation—in the worst cases, consistently preventing a party with a voting majority from electing a legislative majority.¹ Chief Justice Roberts foreclosed further federal-court adjudication of partisan gerrymander claims this term in *Rucho v. Common Cause*, holding that partisan gerrymanders present nonjusticiable political questions.² In doing so, Chief Justice Roberts shifted the responsibility to regulate gerrymandering from federal to state courts, noting favorably how “[p]rovisions in state statutes and state constitutions can provide standards and guidance for state courts to apply.”³ But his view that state courts can constrain gerrymandering is overly optimistic. State courts struggle to identify when discretionary political goals so predominate over required constitutional and statutory criteria that they must invalidate districts.

One approach to curb gerrymandering is to appeal to traditional redistricting criteria, such as requiring compact districts, because gerrymandering often results in districts with convoluted shapes. Compactness, however, has become an unnecessarily complex legal standard. Well-intentioned scholars have proposed “almost a hundred” different compactness measures.⁴ Currently, no federal compactness standard exists,⁵ but state constitutions and laws do have varying formal compactness standards. Thirty-seven states require compact state legislative districts and twenty-one require compact congressional districts.⁶ Additionally, states may choose to impose compactness standards on themselves during the redistricting process.

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1. For comprehensive current and historical measures of partisan gerrymandering, see PLANSCORE, <https://planscore.org> [<https://perma.cc/6HZT-HF8X>].
 2. *Rucho v. Common Cause*, No. 18-422, slip op. (2019).
 3. *Id.* at 31.
 4. Aaron Kaufman, Gary King & Mayya Komisarchik, *How to Measure Legislative District Compactness if You Only Know It When You See It* (forthcoming) (manuscript at 2), <https://gking.harvard.edu/files/gking/files/compact.pdf> [<https://perma.cc/3APD-MMXD>]. For a review, see Richard G. Niemi et al., *Measuring Compactness Standard in a Test for Partisan and Racial Gerrymandering*, 52 J. POL. 1155-81 (1990). See also Micah Altman, *Modeling the Effect of Mandatory District Compactness on Partisan Gerrymanders*, 17 POL. GEOGRAPHY 989-1012 (1998).
 5. However, federal courts consider compactness in voting rights cases as one of the traditional redistricting principles whose subordination may trigger strict scrutiny when bizarrely shaped districts are allegedly drawn along racial lines. *Shaw v. Reno*, 509 U.S. 630, 631 (1993) (“Redistricting legislation that is alleged to be so bizarre on its face that it is unexplainable on grounds other than race demands the same close scrutiny, regardless of the motivations underlying its adoption.”).
 6. See Appendix, *infra*.

Even where compactness standards exist, courts have difficulty enforcing them. There is no clear threshold at which a given compactness measure's numeric value indicates a violation. No court has required a district to be redrawn solely for violating a state constitutional compactness requirement since 1981, when the Illinois Supreme Court voided a state senate district that was "tortured, extremely elongated in form" and "not compact in any sense."⁷ The Illinois court's language is typical of what Bernard Grofman calls the "interocular test" — a scientific-sounding restatement of Justice Stewart's celebrated obscenity definition, "I know it when I see it."⁸ Pennsylvania, Florida, Alaska, and Virginia courts have weighed state compactness standards in addition to other criteria when striking down legislative maps.⁹ Aside from these few cases, compactness standards are paper tigers that could roar, if only state courts could find a consistent way to apply them.

This Essay does not add to the crowded field of compactness measures; rather, it proposes a test for identifying when a district is legally suspect under a state's already-chosen compactness standard. If widely adopted, this test could reinvigorate compactness as a meaningful redistricting constraint. In a nutshell, the proposed Predominance Test works in the following manner: first, create a maximally compact comparison plan by (1) drawing any mandatory districts and freezing them into place; and (2) drawing the most compact plan possible for the remaining districts, while respecting equal population and contiguity. Then, compare districts in the target plan (the plan being analyzed) to their maximally compact district equivalents. If the compactness of a target district is less than fifty percent of the maximally compact district, then discretionary factors have predominated over compactness and a violation has occurred. The only exception is a compelling state interest, such as conforming district boundaries to noncompact geographic features like meandering rivers.

The proposed Predominance Test has three virtues. First, it provides a judicially manageable standard to identify when a compactness violation occurs

7. Schrage v. State Bd. of Elections, 430 N.E.2d 483, 487 (Ill. 1981).

8. Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) ("But I know it when I see it, and the motion picture involved in this case is not that."); Bernard Grofman, *What Happens After One Person-One Vote? Implications of the United States Experience for Canada*, in DRAWING BOUNDARIES: LEGISLATURES, COURTS, AND ELECTORAL VALUES 156, 165 (John C. Courtney, Peter MacKinnon & David E. Smith, eds., 1991) ("[M]y own view, quite simply, is that the most powerful statistical test for partisan gerrymandering is (as it is in so many other areas) the interocular test, i.e., 'Does the evidence for gerrymandering leap up and hit you between the eyeballs?'").

9. *In re* 2011 Redistricting Cases, No. 4FA-11-02209CI (Alaska Super. Ct. 2011); League of Women Voters of Fla. v. Detzner, 172 So. 3d 363 (Fla. 2015); League of Women Voters of Pa. v. Commonwealth, No. 159 MM 2017 (Pa. Feb. 19, 2018); Jamerson v. Womack, 423 S.E.2d 180 (Va. 1992).

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within a legal framework familiar to courts. Second, the test is adaptable to any state's compactness standard. Third, the test does not establish a lower bound on compactness that must be applied uniformly to all districts; rather, compactness is evaluated with respect to what is possible in the district's geographic region.

Part I of this Essay reviews federal and state compactness requirements. Given the difficulty of imposing a new universal compactness requirement, any judicially manageable standard for measuring compactness must be adaptable to the context in which it is applied. Part II describes how threshold values for compactness measures are poor metrics to determine when districts are sufficiently compact to pass legal muster. Drawing on these insights, Part III first proposes the Predominance Test and then describes its application in a recent challenge to Virginia's state legislative districts, where a state district court judge accepted the test. Part IV explains why adopting the test is preferable to simply adding new compactness measures. Finally, Part V discusses strategies for adopting the Predominance Test during redistricting.

I. DISTRICT COMPACTNESS STANDARDS

The task of redistricting and enforcing compactness falls primarily on state governments. The federal government has the power to regulate congressional redistricting under Article I, Section 4 of the United States Constitution.¹⁰ It thus has the authority to require compactness for congressional districts. But it has not done so since 1911.¹¹ Federal courts do consider districts' compactness at all levels of government with respect to race. However, courts' role in the race context is to adjudicate when race is subordinated to traditional redistricting principles, not to apply a general compactness requirement to all districts.¹²

Without a federal requirement, district compactness standards exist primarily in state constitutions, laws, and court opinions, and may even be self-imposed

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10. U.S. CONST. art. I, § 4 (“The Times, Places and Manner of holding Elections for Senators and Representatives, shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by Law make or alter such Regulations, except as to the Places of chusing Senators.”).
 11. Apportionment Act of 1911, Pub. L. No. 62-5, § 3, 37 Stat. 13, 14 (providing that “Congress shall be elected by districts composed of a contiguous and compact territory”).
 12. *Thornburg v. Gingles*, 478 U.S. 30, 50 n.17 (1986) (noting that plaintiffs alleging a violation of Section 2 of the Voting Rights Act must show the existence of a remedial district that is “sufficiently large and geographically compact”); *see also* *Shaw v. Reno*, 509 U.S. 630, 644 (1993) (observing that “redistricting legislation that is so bizarre on its face that it is ‘unexplainable on grounds other than race,’ . . . demands the same close scrutiny that we give other state laws that classify citizens by race” (internal citation omitted)).

during the redistricting process. Thirty-seven states have a compactness requirement for either state legislative or congressional districts.¹³ However, states' compactness requirements range from specific measures to vague appeals to compactness. Some states even impose different requirements on congressional and state legislative districts. Five establish explicit compactness measures that effectively minimize districts' perimeters or areas. Sixteen have more general language that appears to favor compactness measures in terms of districts' shape, without further considerations. Exceptions among these states are California, which weighs the location of population within districts,¹⁴ and Maine, which considers travel distances across districts.¹⁵ Eighteen other states have a general compactness requirement that does not favor a specific measure.¹⁶ The variation across states underscores the need for a compactness test that can adapt to each state's legal requirements.

II. WHEN IS A DISTRICT SUFFICIENTLY COMPACT?

For a court to evaluate whether a district violates a state compactness requirement, judges must know when a district becomes so contorted that it is legally suspect. A compactness measure uses a formula to produce a value indicating how compact a district is. Typically, these numbers range between zero (the least compact) and one (the most compact). At what value does a district violate a compactness requirement? Is it 0.25? 0.50? 0.75? Does that value change depending on which compactness measure is employed?

The typical approach to answering these questions is to use thresholds, above which any value is deemed to comply with a compactness requirement. For example, under court order to draw new state legislative districts following the 2000 census, the Arizona Independent Redistricting Commission adopted a

13. See Appendix, *infra*, for an in-depth survey of federal and state district compactness standards.

14. CAL. CONST. art. XXI, § 2(d)(5) (“[D]istricts shall be drawn to encourage geographical compactness such that nearby areas of population are not bypassed for more distant population.”).

15. ME. REV. STAT. ANN. tit. 21A, § 1206-A (2018) (“[A] ‘functionally contiguous and compact territory’ is one that facilitates representation by minimizing impediments to travel within the district. Impediments to travel include, but are not limited to, physical features such as mountains, rivers, oceans and discontinued roads or lack of roads.”).

16. Astute readers will note that the count of states sums to thirty-nine, rather than thirty-seven, due to Pennsylvania and Virginia being double-counted for having general compactness requirements, with their state supreme courts having indicated a preference for specific compactness measures.

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minimum compactness score, which it claimed complied with the state constitutional compactness requirement.¹⁷ Similarly, following the 2010 census, the Virginia legislature defended a challenge to its proposed districts by arguing that the challenged districts were more compact than those the Virginia Supreme Court had previously approved.¹⁸

One problem with thresholds is that they apply the same compactness standard to all districts. District compactness is constrained by the local geography and other required goals, such as federal and some states' voting-rights requirements. (Hereafter, I refer to districts subject to these latter requirements as "voting-rights districts.") A district situated along a jagged river or coastline will fare worse on compactness measures that incorporate district perimeters into their formulas than will districts located in flat plains that can easily be drawn into squares. Indeed, straight-line features, such as roads and political boundaries, facilitate drawing more compact districts on perimeter-based measures.

Compactness standards, currently found in state law, are a lower priority for redistricting authorities than the federal requirements of equal-population and voting-rights compliance. Districts drawn in compliance with voting-rights requirements may be compact, but are not necessarily so. A voting-rights district's compactness is affected by geography and the regional distribution of minority communities. Indeed, the Virginia Supreme Court specifically noted that the confluence of voting rights and geography could result in districts of varying compactness, finding that "the mandatory constitutional requirements of equal representation and minority representation meant that rural districts, such as those in Southside Virginia, would compare unfavorably in compactness with urban districts, and with other rural districts that did not have large minority group populations."¹⁹

Additionally, once a mandatory voting-rights district is drawn, it essentially becomes locked into place. This hard line may then affect the compactness of adjacent districts. Even when shared borders are regularly shaped, a voting-rights district may have secondary effects by squeezing adjacent districts against another inviolate boundary, such as a state border or another voting-rights district. It should be noted that a bizarrely shaped district is not necessarily unconstitutional. Rather, when race predominates over traditional redistricting principles such as compactness, courts apply strict scrutiny to determine if the district

17. I was a consultant to the Arizona Independent Redistricting Commission, which directed me to draw districts with a Polsby-Popper compactness score of at least 0.17.

18. I served as an expert witness for the plaintiffs in this case, *Page v. Va. State Bd. of Elections*, 58 F.Supp.3d 533 (E.D. Va. 2014). The threshold compactness scores in the prior case, *Jamerson v. Womack*, 423 S.E.2d 180, 185 (Va. 1992), were a Reock score of 0.12 and a Polsby-Popper score of 0.10.

19. *Jamerson*, 423 S.E.2d at 185.

is drawn to achieve a legitimate state interest, such as preventing the dilution of minority voting strength.

III. THE PREDOMINANCE TEST TO EVALUATE DISTRICT COMPACTNESS

The preceding discussion shows that any proposed judicial standard used to detect when a district's compactness is legally suspect should have two features. First, a standard must not be tied to a single compactness measure, since multiple compactness measures exist and are allowable in the current legal framework. Second, it must be flexible, allowing a judge to evaluate compactness within the context of a district's location and purported goals. Without these features, the standard would not be judicially manageable.

Considering these two requirements, this Essay proposes the Predominance Test. This Part describes each step of the test and then explains the choice of predominance as a satisfactory legal framework. It concludes by examining the Predominance Test's application in a real-world case.

The Test is not perfect. An important consideration is that the Test is generally conservative, in that it may fail to identify a potential compactness violation when one exists. But it does not falsely identify a potential violation where none exists. Courts may prefer this because it helps them err on the side of caution when weighing important matters of representative democracy.

A. *The Predominance Test*

The steps of the Predominance Test are as follows:

1. Draw mandatory voting-rights districts, as well as any other required districts, and lock them into place.
2. Draw the most compact redistricting plan possible in the remaining territory. This is designated as the maximally compact comparison plan.
3. For each challenged district, identify the nearest equivalent district in the maximally compact comparison plan.
4. Compare the two districts. If the challenged district is at least fifty percent less compact than the maximally compact district, it is legally suspect and requires a remedial redistricting plan.

The rest of this Section describes each of these four steps in detail.

1. Step One: Draw Mandatory Districts

The first step of the Predominance Test is to draw any mandatory districts required under federal and state law. Redistricting criteria exist in a hierarchy. Federal criteria of equal population and compliance with the Voting Rights Act supersede any state criteria. State criteria may also be hierarchical. Compactness may be the sole requirement or may exist above, below, or on the same level as other criteria. For example, a state may first require the formation of single-county districts where possible. Under Step One, any districts mandated by the criteria prioritized above compactness would be fixed in place first.²⁰ This is easily accomplished with modern redistricting software, which allows users to lock in districts to protect them from inadvertent editing.

The Predominance Test works best when compactness sits in its own tier in the criteria hierarchy. The Predominance Test can still work if there are other binary criteria at the same tier. For example, many state constitutions require districts to be of “compact and contiguous territory.” Contiguity, which requires that all points of a district connect, is a binary criterion: districts are either contiguous or not. As long as the maximally compact comparison plan created in Step Two is also contiguous, then the only remaining criterion in that tier is compactness. Similarly, some states may place respect for local boundaries on par with compactness. Respect for local boundaries can be considered a binary criterion, too, if the maximally compact comparison plan drawn in Step Two has the same number of local boundary splits as the challenged plan or fewer.

Criteria on the same tier as compactness that are also measured gradationally or cannot be measured at all are difficult to fit within the Predominance Test framework. Gradational criteria are those measured on a scale. For example, the efficiency gap, a measure of partisan fairness, is gradational, in that a redistricting plan is scored in terms of the percentage of a party’s votes “wasted.”²¹ The Predominance Test still works if a gradational criterion has the same or better value in the maximally compact comparison plan as it does in the adopted plan. A comparison plan that fares slightly worse than an adopted plan on a gradational criterion on the same tier is more problematic for the Predominance Test. In this situation, an observer cannot determine to what degree a redistricting

20. For example, suppose there existed a voting-rights district that could be drawn in a more compact manner, while continuing to elect a minority community’s candidate of choice. Further, drawing this district would increase the overall compactness of the maximally compact comparison plan. The proposed methodology to freeze voting-rights districts in place would fail to find this maximally compact plan. In litigation, this scenario errs in favor of defendants. See *infra* Section III.A.2.

21. Nicholas O. Stephanopoulos & Eric M. McGhee, *Partisan Gerrymandering and the Efficiency Gap*, 82 U. CHI. L. REV. 831, 834 (2015).

authority valued a goal, such as minimizing county splits, over the goal of compactness. Courts may adjudicate this challenge when they observe extreme tradeoffs between same-tiered criteria, such as an adopted plan that splits one fewer county but is much less compact than a maximally compact comparison plan.

Unmeasurable criteria are more problematic. For example, some states mandate respect for communities of interest whose boundaries are not clearly defined. With such an ill-defined criterion, it is difficult to determine if the maximally compact comparison plan complies to the same degree as an adopted plan, since we cannot know how communities were defined and how much a map drawer prioritized respecting communities over compactness.

These caveats apply only to a criterion that is on the same tier as compactness. The Predominance Test otherwise is agnostic to criteria lower in priority than compactness, and all discretionary criteria that are not explicitly described in constitutions and statutes. Perhaps primary among these are political goals, such as partisan advantage-seeking or avoiding contests between incumbents. This agnosticism is a virtue of the Predominance Test.

2. *Step Two: Draw the Maximally Compact Comparison Plan*

The next step is to draw the most compact redistricting plan possible, while freezing into place any voting rights or other required districts. This maximally compact comparison plan serves as a benchmark from which courts will evaluate the compactness of challenged districts. A virtue of the Predominance Test is that it accommodates any applicable compactness measures, many of which courts and legislatures have already recognized. Map drawers need only be guided by applicable compactness measures when drawing the comparison plan. The selection of a compactness measure may affect the Test's performance; however, a truly noncompact district tends to fare poorly on multiple measures.²²

All districts (other than required districts at Step One) should be drawn compactly, not just those in the vicinity of the challenged districts. Because there is a bounded surface on which to draw districts, it may be possible to maximize the compactness of one district at the expense of another. For example, if the operational compactness measure scores circles as the most compact shape, drawing a circular district means adjacent districts would be less compact since circular districts cannot be drawn everywhere. Aside from the obvious gaming of the system that may displease a court, manipulation of district compactness in this manner may violate the Fourteenth Amendment's equal-protection guarantee, in that persons residing in different districts are not treated in a similar

22. Niemi et al., *supra* note 4, at 1176; Altman, *supra* note 4, at 997.

manner. If the maximally compact comparison map is manipulated such that one district was drawn more compactly in a manner that forced another district to be less compact, this may permit map drawers greater discretion to gerrymander.

There are computational complexities when optimizing a scoring function used to evaluate redistricting plans.²³ There are more ways to assign census blocks to districts in a typical midsized state than there are quarks in the universe.²⁴ As a consequence of this complexity, no candidate comparison redistricting plan – whether created by a computer or by a human brain – can be known with certainty to be the most compact plan possible.

The almost-certain failure to find the most compact redistricting plan may seem a fatal flaw to the Predominance Test. It is not. The Predominance Test compares the compactness of a challenged district to the compactness of a district in the comparison plan. As described in Step Four, if compactness has been degraded by more than fifty percent, then required lower-tier and discretionary criteria have predominated over compactness. Measuring the adopted plan against any less-than-optimally-compact comparison results in a Predominance Test that will more likely find a challenged district is constitutional when it is in fact constitutionally suspect (known as a false negative or Type II error). Judges should find this to be a virtue, since it means the Test errs in favor of upholding plans.

There are two relevant situations where identifying a maximally compact comparison plan is relevant to Step Two: during litigation and during the redistricting process to guard against future litigation. First, during litigation, plaintiffs are motivated to find the most compact comparison plan to bolster their allegations of legal violations. Defendants may present a counterplan that, perhaps due to how district compactness affects adjacent districts, paints the challenged districts in a more favorable light. This counterplan must have districts at least as compact, on average, as the plaintiffs' plan in order to prevent them from gaming the Test. If defendants cannot put forward such a counterplan, a court may assume one is not easily discoverable.

23. See generally Micah Altman & Michael McDonald, *The Promise and Perils of Computers in Redistricting*, 5 DUKE J. CONST. L. & PUB. POL'Y 69 (2010) (examining the constraints of employing computers in redistricting).

24. Altman, *supra* note 4, computes there are 4×10^{245} redistricting plans for a small jurisdiction of 250 census blocks divided into two districts. A typical state has hundreds of thousands of census blocks and is divided into more districts. There are an estimated 3.28×10^{80} quarks in the universe. See Jay Bennett, *How Many Particles Are in the Observable Universe?*, POPULAR MECHANICS (July 11, 2017), <https://www.popularmechanics.com/space/a27259/how-many-particles-are-in-the-entire-universe> [https://perma.cc/NL8U-DRVU].

Second, state legislatures and commissions may impose a Predominance Test upon themselves during the redistricting process in anticipation of future litigation or to adhere to good government goals. In this situation, opposition political parties are motivated to submit a compact comparison plan to constrain whomever controls the redistricting process. Ideally, the public should be allowed to draw and submit comparison plans for consideration, too, to counter collusion between the governing parties. If a court finds a legislature or commission acted in good faith to generate the best available comparison plan, it can reject a later challenge if plaintiffs, given more time, discover a more compact comparison plan.

3. Step Three: Identify a Comparison District

The third step is to identify which district in the comparison plan a court should use to analyze each challenged district. The best district in the comparison plan to evaluate a challenged district against is the district with the maximum overlap. There are two readily available measures that can be used to determine district overlap: area and population. The area approach calculates the shared area of two districts, and the population approach calculates the shared population. Since districts function to represent people, a population approach may be preferable, although courts may interpret their state law to give more credence to area comparisons.

When the population changes dramatically across a state or relative to other states, the proper comparison district may not be obvious. In order to comply with equal-population requirements, districts in slow-growing areas of a state may be collapsed and new districts created in faster-growing areas. As a consequence, the same district may be the best comparison for two or more challenged districts, or two or more comparison districts may be the best comparison for one challenged district. In these cases, the recommendation to create the most compact overall redistricting plan, and not just for the challenged districts, becomes relevant. When there is a dispute over which districts to compare, plaintiffs can inoculate themselves from allegations of manipulating district compactness by drawing other districts that overlap with a challenged district in a compact manner. If all candidate comparison districts that overlap with the challenged district indicate a violation of the Predominance Test, then defendants' accusations of cherry-picking comparison districts are weakened.

In most practical applications, overlapping districts will corroborate a violation of the Predominance Test in this way. However, if a particularly noncompact district exists in the comparison plan, perhaps due to its proximity to a voting-rights or other required district, judges should be skeptical of claims that this

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noncompact district is an appropriate comparison if only a small sliver of it overlaps with other districts. In such situations, judges can either reject the district as a viable comparison or weigh the average compactness of overlapping districts by their overlapping area or population. If a legislature or commission uses the Predominance Test during its redistricting process, it should explicitly identify the comparison districts that were used to compute the Predominance Test for each district.

4. *Step Four: Compare Compactness of Challenged District to Comparison District*

The fourth step is to compare the compactness of the challenged and comparison districts, resulting in a measure of compactness degradation. This is a straightforward calculation, done using the desired compactness measure. First, compute the compactness of the comparison district. Second, subtract the compactness of the challenged district. Third, divide this quantity by the compactness of the comparison district. This computation yields the percentage decrease in compactness in the challenged district.²⁵ If this decrease is less than fifty percent, the district has passed the Predominance Test: compactness has predominated over all lower-tier redistricting criteria and any discretionary criteria. If the decrease is fifty percent or more, then other lower-tier redistricting criteria and discretionary criteria have predominated over (or, in the case of a fifty percent decrease, been as significant as) compactness. In such cases, a compactness violation has occurred.²⁶

25. Compactness measures may also be calculated in percentages ranging from 0% to 100%. It is important to not confuse the *percent decrease* in compactness that is the basis of the Predominance Test with the *percentage point difference* in compactness between the comparison district and the challenged district. For example, if a comparison district has a compactness of 51% and the challenged district has a compactness of 20%, the percent decrease of compactness is 61% (51% minus 20%, divided by 51%). It is not 31%, which is the simple percentage point difference of the two compactness scores.

26. The Predominance Test implicitly assumes that compactness is measured within a zero to one interval, and that a true zero exists. To understand what is meant by a “true zero” and why this is assumed, consider that the degradation of compactness is always calculated to be 100% if the challenged district has a compactness score of zero. Some truly bizarrely shaped districts can score practically close to zero on some compactness measures. Perhaps the best example is that only a nonsensical district that exists at a point would have zero length district perimeter, a compactness measure used by Colorado and Iowa.

But the Predominance Test can also be calibrated for compactness measures that do not have a theoretical true zero. To do so, compute the difference in the compactness scores of the comparison and challenged districts, as before. Divide this quantity by the difference of the challenged district and, instead of zero, the theoretical minimum compactness score. For example, suppose the theoretical minimum compactness score is 10%. Then, if the compactness

B. Why Predominance?

The Predominance Test requires a district to be at least half as compact as possible. The choice of fifty percent degradation is rooted in the definition of “predominant,” which means “having superior strength, influence, or authority.”²⁷ A court could interpret a compactness requirement to mean districts must be literally as compact as feasible. However, courts recognize that governments often balance other goals during redistricting, even if these goals are subordinate to compactness. For example, Colorado and Iowa might want to draw square districts to adhere to their compactness measures, while also trying to respect local political boundaries and geographic features. Not wishing to second-guess policy and political decisions, courts generally give governments wide discretion when drawing districts, thus finding compactness violations in only the most extreme cases. The Predominance Test can help courts enforce compactness as a required criterion, while allowing governments discretion to pursue other goals as well.

An analogy to the Predominance Test already exists in redistricting; courts ask a predominance question when adjudicating allegations of Fourteenth Amendment violations with respect to race. Courts often cite the Supreme Court’s articulation of racial predominance in a challenge to Georgia’s congressional districts in the 1990s that “race was the predominant factor motivating the legislature’s decision to place a significant number of voters within or without a particular district.”²⁸ Plaintiffs must prove that “the legislature subordinated traditional race-neutral districting principles, including but not limited to compactness, contiguity, and respect for political subdivisions or communities defined by actual shared interests, to racial considerations.”²⁹ This means that race must not be subordinated to the list of race-neutral principles taken together. So, too, with the Predominance Test for compactness. A degradation of compactness by more than fifty percent indicates that those who drew the districts valued other criteria above compactness.

of the comparison district is 51% and the challenged district is 20% (as before), divide the difference of 31% by 51% minus 10%, or 41%. In this example, the predominance test finds a 76% compactness degradation, which is higher than when a true zero is assumed. An important consequence of nonexistence of a true zero value for a compactness measure is that if a true zero is assumed when one does not exist, the Predominance Test will fail to identify potential constitutional violations where they may exist (another Type II error). Judges may again find this feature desirable, since the test will err in favor of government defendants when identifying compactness violations.

27. *Predominant*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/predominant> [<https://perma.cc/Q6EX-5NDD>].

28. *Miller v. Johnson*, 515 U.S. 900, 916 (1995).

29. *Id.*

It is important to note that the inverse is not necessarily true; if compactness degradation is less than fifty percent, the result is indeterminate, especially if other goals correlate highly with compactness. For example, suppose a legislature valued respect for county boundaries more than compactness and could draw conveniently square-shaped districts from square-shaped counties. The resulting districts would be highly compact and likely to pass the Predominance Test, but external observers could not determine by the Test alone if the legislature weighed compactness or respect for county boundaries more in its decision-making. This extends to any criteria or goal subordinate to compactness, including partisan gerrymandering. Plaintiffs would need other evidence if they wished to claim that impermissible goals predominated. Again, this is a virtue because the Test errs in favor of defendants. And at the same time, it reliably identifies the most egregious compactness violations, as the subsequent Virginia application demonstrates.

C. *Vesilind v. Virginia State Board of Elections*

In *Vesilind v. Virginia State Board of Elections*, plaintiffs implemented the Predominance Test in a compactness challenge to districts for both chambers of the Virginia state legislature.³⁰ Virginia was a suitable candidate for a predominance challenge because its state constitution requires only compactness and contiguity, in addition to higher-order federal voting-rights and equal-population criteria.³¹ Using the Predominance Test, the plaintiffs challenged six Senate districts and five House of Delegates districts drawn in 2011. The Democratic-controlled Senate and Republican-controlled House had both engaged in a bipartisan log-roll to draw redistricting plans for their respective chambers.

In my capacity as plaintiffs' expert, I first directed the drawing of maximally compact comparison redistricting plans. At that first step, existing voting-rights districts in Virginia's Senate and House of Delegates were locked into place. Next, we drew equal-population and contiguous districts in the remainder of the state to maximize compactness. I then compared the compactness of challenged districts in the adopted plan to the districts in the comparison plan. For every district, the percent degradation was greater than fifty percent. The Predominance Test thus indicated that discretionary factors had predominated over compactness. Because compactness measures account for different aspects of compactness, they can vary, even though they generally point in the same direction.

30. No. CL15-3886, 2016 WL 7030541 (Va. Cir. Ct. 2016).

31. Virginia technically has an equal population criterion, too. VA. CONST. art II, § 6 ("Every electoral district shall be composed of contiguous and compact territory and shall be so constituted as to give, as nearly as is practicable, representation in proportion to the population of the district.").

No challenged district passed the Predominance Test utilizing the Reock or Polsby-Popper measures, which the author of the state House plan had used to score districts.³² The best-performing district among the eleven that were challenged was Senate District 30, which had only a 58% degradation on the Reock measure; the worst district was House District 72, which had an 88% degradation on the Polsby-Popper measure. To diminish a potential claim by defendants that I cherry-picked districts in the comparison plan, I noted how the adopted plan's challenged districts failed the Predominance Test for every intersecting non-voting-rights district in the comparison plan.

I then produced alternative Senate and House plans that satisfied the Predominance Test, and also achieved the legislature's other measurable goals—minimizing incumbent pairing and local boundary splits—to the same degree or better than the adopted plans.³³ Although these goals were discretionary, the existence of the alternative plans that performed better on both compactness and discretionary criteria showed that other goals, likely political in nature, had indeed predominated over compactness.

In the trial court's ruling, Judge Marchant found "some degree of persuasiveness to both the test and Dr. McDonald's conclusions."³⁴ He explained his reasoning:

While [the predominance] test is novel and untested in this context, the Court does find that Dr. McDonald's testimony and accompanying conclusions do merit serious consideration. Certainly it appears that the adding of discretionary criteria to the legislative redistricting process increased the degradation of the districts' compactness. The predominance

32. Plaintiffs drew districts to maximize three compactness measures: Reock, Polsby-Popper, and Schwartzberg. Plaintiffs selected the first two measures due to their precedential value, appearing first in *Jamerson v. Womack*, 423 S.E.2d 180 (Va. 1992). Plaintiffs selected Schwartzberg because the Virginia Attorney General's office included the measure in their Voting Rights Act Section 5 submission to the federal government. Later, the author of the House of Delegates plan testified that he had only evaluated plans on the Reock and Polsby-Popper measures. The exclusion of the Schwartzberg measure did not substantively affect the conclusion that other discretionary factors predominated over compactness for the challenged House of Delegates districts.

33. Where the adopted Senate plan split forty-six counties or independent cities, the alternative plan split thirty-four; and where the adopted plan split 120 precincts, the alternative plan split thirty-two. The alternative House plan paired the same number of incumbents (eight) as the adopted plan. Where the adopted House plan split fifty-nine counties or independent cities, the alternative plan split fifty-eight; and where the adopted plan split 116 precincts, the alternative plan split 113.

34. Opinion & Order at 13, *Vesilind v. Va. State Bd. of Elections*, No. CL15-3886 (Va. Cir. Ct. Mar. 31, 2017).

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test and resulting conclusions appear to be relevant, logical, and founded on generally acceptable compactness measurements.³⁵

Judge Marchant's ruling passed the Predominance Test over an important legal hurdle regarding the admissibility of a novel test.³⁶ However, while Judge Marchant found the Predominance Test compelling, he ruled that both sides offered evidence that would lead reasonable and objective persons to reach different conclusions about the constitutionality of the challenged districts. He thus found that the legislative action was "fairly debatable" and should be upheld.³⁷ On appeal, the Virginia Supreme Court agreed with this assessment.³⁸ But it may be that the Predominance Test, having cleared the hurdle of admissibility, will find greater acceptance in future Virginia litigation or elsewhere, perhaps in states like Florida and Pennsylvania where the supreme courts have previously overturned plans on state constitutional grounds.

IV. CHOOSING THE PREDOMINANCE TEST OVER NEW COMPACTNESS MEASURES

Some scholars and advocates advance the idea that gerrymandering can be curtailed by adopting a new and innovative compactness measure for drawing districts. This approach falls short on two accounts.

First, adopting a new compactness measure means changing existing state law and, in the most extreme cases, amending state constitutions. These are often costly enterprises. The Predominance Test offers an end to the quixotic quest for the ideal compactness measure because it can be used with any compactness measure.

Second, a standard must provide a bright line as to when a district is legally suspect, while taking into account how voting rights and geographic features practically constrain districts' compactness. A compactness measure alone does not help determine when a district is legally suspect. The Predominance Test helps to determine precisely that. Courts need only compare the challenged districts with districts in a near-optimally compact redistricting plan, using the preferred compactness measures. Additionally, the Predominance Test can be flexibly applied to geography and voting-rights districts. Districts' compactness is

35. *Id.*

36. VA CODE ANN. 8.01-401.3.A ("In a civil proceeding, if scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education may testify thereto in the form of an opinion or otherwise.")

37. Opinion & Order, *supra* note 34, at 14.

38. *Vesilind v. Va. State Bd. of Elections*, 813 S.E.2d 739 (Va. 2018).

compared within the context of where they are drawn, not adjudicated according to an arbitrary threshold value.

V. STRATEGIES TO ADOPT THE PREDOMINANCE TEST DURING REDISTRICTING

The Predominance Test need not be exclusively a courtroom tool, nor need it be written into state constitutions. Legislatures and redistricting commissions can formally adopt the test during their regular redistricting process. Those charged with redistricting generally have broad discretion over how they implement redistricting criteria, and can bind themselves to adhere to additional criteria if they so desire. State legislatures, or their committees tasked with redistricting, often adopt additional rules and procedures through legislative resolutions, some of which are referenced in the Appendix. A commission may use the Predominance Test to implement a compactness requirement found in a state constitution or statute. A state could adopt the Predominance Test into law. If compactness is not a required criterion sitting in a hierarchy as discussed, the state could implement a threshold other than 50% compactness degradation, such as a tighter 25% or a more lenient 75% degradation. However, if a state wished to inoculate itself from a later legal challenge, I recommend adopting the 50% threshold.

If a state wishes to use the Predominance Test, I suggest the following procedures, drawn from my thirty years of redistricting experience. Start by creating a maximally compact comparison plan. Mapping consultants can draw voting-rights districts and any other required districts and then optimize the remaining districts using preferred compactness measures. As a practical matter, drawing required voting-rights districts tends to be time-consuming due to the analysis of racial and ethnic voting patterns necessary to draw effective minority opportunity districts. I suggest the work on the comparison plan and voting-rights districts take place in parallel, and that the two strains of work are married together when the voting-rights analyses are complete. This parallel work is possible because there are often regions of a state far from areas of voting-rights concerns, which can be drawn independently.

Legislatures and commissions can draw their own comparison plans during the redistricting process, but there is a danger that they might produce a suboptimal comparison plan to allow for greater discretion to gerrymander. I believe that comparison plans should be solicited from the public to ensure the creation

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of a near-maximally compact redistricting plan and to inoculate redistricting authorities from future litigation.³⁹ These plans could be generated by any mechanism: by humans, algorithms, or a combination thereof through computer-assisted design. The goal is simply to create the most compact comparison plan discoverable, conditional on other required redistricting goals, in the limited time before new districts must be enacted. A redistricting authority can then adjust the proposed map to ensure that it passes the Predominance Test.

CONCLUSION

This Essay does not address whether a compactness requirement is a desirable districting criterion; rather, it proposes the Predominance Test for when a state already requires compact districts. Nevertheless, the question looms whether partisan gerrymanders could be created as a byproduct of following compactness requirements. Some argue that a compactness standard favors Republicans, due to clustering of Democrats in urban areas.⁴⁰ But I do not think that the tension between compactness and political fairness is so great as to preclude the creation of fair districts.⁴¹ Legislatures and commissions can draw redistricting plans that faithfully reflect partisan composition and that are also compact to the extent possible.⁴²

Once a state requires compact districts, the Predominance Test is a practical solution to curbing partisan gerrymandering to at least some degree, and it can be employed within many states' existing legal frameworks. Importantly, a Virginia district court has accepted the test, despite its novelty, paving the way for other courts to consider it. By leveraging existing compactness criteria, reformers and litigants using the Predominance Test can constrain redistricting authorities from enacting the most extreme gerrymanders. The test is not a panacea for taking politics out of redistricting. It does, however, limit the most egregious

39. See ALTMAN & McDONALD, *THE PUBLIC MAPPING PROJECT: HOW PUBLIC PARTICIPATION CAN REVOLUTIONIZE REDISTRICTING* (2018).

40. See Daniel H. Lowenstein & Jonathan Steinberg, *The Quest for Legislative Districting in the Public Interest: Elusive or Illusory?*, 33 UCLA L. REV. 1, 23 (1985).

41. Micah Altman & Michael P. McDonald, *Paradoxes of Political Reform: Congressional Redistricting in Florida*, in *JIGSAW PUZZLE POLITICS IN THE SUNSHINE STATE* 163 (Seth McKee ed., 2015); Micah Altman & Michael McDonald, *Redistricting by Formula: An Ohio Reform Experiment*. 46 AM. POL. RES. 103 (2018); Micah Altman & Michael P. McDonald, *A Half-Century of Virginia Redistricting Battles: Shifting from Rural Malapportionment to Voting Rights to Public Participation*, 47 U. RICH. L. REV. 771, 816-17 (2013).

42. For example, the Florida Supreme Court and the Pennsylvania Supreme Court have interpreted their state constitutions to require politically fair redistricting plans with compact districts. See *League of Women Voters of Fla. v. Detzner*, 172 So.3d 363 (Fla. 2015); *League of Women Voters of Pa. v. Commonwealth*, 178 A.3d 737 (Pa. 2018).

gerrymanders in states where reform prospects are dim but compactness is required.

Michael McDonald is an Associate Professor at University of Florida, specializing in American elections and methodology, including redistricting. He has been a redistricting consultant in thirteen states, either to governments or parties in litigation, and co-leads a national effort to increase transparency and public participation in redistricting. See MICAH ALTMAN & MICHAEL P. MCDONALD, THE PUBLIC MAPPING PROJECT: HOW PUBLIC PARTICIPATION CAN REVOLUTIONIZE REDISTRICTING (2018). This Essay is inspired by the author's role as an expert witness in Vesilind v. Virginia State Board of Elections, No. CL15-3886, 2016 WL 7030541 (Va. Cir. Ct. 2016), a compactness challenge to Virginia's state legislative districts. He would like to thank deeply the litigation team – Wyatt Durette, Nicholas Mueller, and Christine Williams – and Virginia's redistricting reform community, led by Brian Cannon at OneVirginia2021. This work would not be possible without their support. This Essay was greatly improved through the thoughtful suggestions of the Yale Law Journal editors.

APPENDIX. STATE COMPACTNESS STANDARDS

Thirty-seven states have a compactness requirement for either state legislative or congressional districts. Compactness requirements may be codified in state constitutions or statutes, or they may be embodied in judge-made law. More ephemeral compactness standards are adopted by legislative committees, legislatures, commissions, or court-appointed masters as a component of self-imposed redistricting criteria for a single redistricting cycle.

A. States with Specific Compactness Measures

Five states explicitly specify compactness measures for congressional or state legislative districts in their constitutions or statutes, or give preference to specific measures in their case law. Table A1 identifies each of these states, their compactness measures, the measures' application to state legislative (SL) or congressional (C) districts, and the measures' source.

TABLE A1
STATES WITH SPECIFIC COMPACTNESS MEASURES

State	Compactness Measure	Source
Colorado (SL, C)	Perimeter Length	COLO. CONST. art. V, § 47(1)
Iowa (SL, C)	Length/Width Ratio & Perimeter Length	IOWA CODE § 42.4 (2019)
Michigan (SL)	Reock (modified)	MICH. COMP. LAWS § 4.261(1)(j)
Michigan (C)	Reock (modified)	MICH. COMP. LAWS § 3.63(3)(c)(vii)
Pennsylvania (C)	Reock, Schwartzberg, Polsby-Popper, Population Polygon, and Minimum Convex Polygon	League of Women Voters of Pa. v. Commonwealth, 178 A.3d 737 (Pa. 2018).
Virginia (SL, C)	Polsby-Popper and Reock	Jamerson v. Womack, 423 S.E.2d 180 (Va. 1992)

Colorado's constitution measures compactness as "the aggregate linear distance of all district boundaries." Iowa statutes describe two compactness measures: a length-to-width ratio applied to the bounding box of a district and a perimeter measure similar to Colorado's. Michigan's constitution describes a

compactness measure known as the Reock measure,⁴³ which compares the area of a district to its bounding circle, but is modified to exclude areas in the bounding circle located in the Great Lakes or in neighboring states. Michigan's statutes apply the same compactness measure to congressional districts.

Two state supreme courts have identified specific compactness measures in prior rulings, which may incentivize governments or courts to consider these measures in a future redistricting. In a 2018 case involving Pennsylvania's congressional districts, the Pennsylvania Supreme Court invited redistricting plans to be submitted to the court for its consideration. The court instructed those wishing to submit plans that they include "a report detailing the compactness of the districts according to each of the following measures: Reock; Schwartzberg; Polsby-Popper; Population Polygon; and Minimum Convex Polygon."⁴⁴ When ordering the adoption of a remedial plan, the court noted that "[t]he compactness of the plan is superior or comparable to the other submissions."⁴⁵ It is unclear exactly how the court weighed these five compactness measures when evaluating plans, and if these compactness measures will be evaluated in future challenged congressional or state legislative plans. But if redistricting issues will arise again after the post-2020 census, it is likely that the same court majority will consider them.

In the 1992 Virginia case *Jamerson v. Womack*, litigants presented two compactness measures: Polsby-Popper (described below) and Reock.⁴⁶ Unlike Michigan, Virginia's court did not modify the Reock measure. These measures were again evaluated in the 2002 case *Wilkins v. West*.⁴⁷ In 2001 and 2015, Virginia's legislature cited these cases when adopting state legislative and congressional redistricting criteria.⁴⁸ At trial in *Vesilind*, the author of the House of Delegates plan, Delegate Chris Jones, said that he only examined these compactness

43. Ernest C. Reock, Jr., *A Note: Measuring Compactness as a Requirement of Legislative Apportionment*, 5 *MIDWEST J. POL. SCI.* 70 (1961).

44. See Jan. 26 Order at 2, *League of Women Voters of Pa. v. Pennsylvania*, 178 A.3d 737 (Pa. Jan. 26, 2018) (No. 159 MM 2017), <http://www.pacourts.us/assets/files/setting-6015/file-6758.pdf> [<https://perma.cc/RU6Y-ED4C>].

45. See Feb. 19 Opinion and Order at 7, *League of Women Voters of Pa.* (No. 159 MM 2017), <http://www.pacourts.us/assets/files/setting-6061/file-6852.pdf> [<https://perma.cc/TPY3-GBE9>].

46. 423 S.E.2d 180, 184 (Va. 1992).

47. 571 S.E.2d 100 (Va. 2002).

48. See Va. Senate Committee on Privileges and Elections Committee Resolution No. 1 (Apr. 3, 2001); Va. House Committee on Privileges and Elections Committee Resolution No. 1 (Apr. 3, 2001); Va. Senate Committee on Privileges and Elections Committee Resolution No. 1, Senate District Criteria (Mar. 25, 2011); Va. House Committee on Privileges and Elections Committee Resolution No. 1, House of Delegates Criteria (Mar. 25, 2011); Va. Senate Committee on Privileges and Elections Committee Resolution No. 2, Congressional District Criteria

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measures because of their precedential value.⁴⁹ Although the legislature could adopt other measures in the future, it defers for the time being to Polsby-Popper and Reock.

B. States with General Compactness Measures

Sixteen states recognize a general class of compactness measures for congressional or state legislative districts in their constitutions, statutes, legislative resolutions, or case law. Table A2 presents states' compactness language and respective sources. Their language varies, and some states use different language for their state legislative and congressional districts. Nine states refer to districts composed of "compact territory," four states refer to "geographically compact" districts, and two states refer to districts with "compact form." One state evaluates districts of "odd shape."

Nearly all of these states conceive of compactness in terms of geography, and thus limit allowable compactness measures to those that measure districts' spatial characteristics. These include the Reock measure, which compares the area of a district to the area of the circle that encompasses it, and others that explicitly consider geographically-bound characteristics of districts, such as their perimeters and areas. The Virginia' Supreme Court made this point clear in *Jamerson v. Womack*, holding that "the use of the words 'contiguous and compact,' as joint modifiers of the word 'territory' in Article II, § 6, clearly limits their meaning as definitions of spatial restrictions in the composition of electoral districts."⁵⁰ Compactness conceptualized in terms of geography alone thereby possibly excludes certain types of compactness measures, such as those that consider the dispersion of population or travel distances (measures to which two states give preference).

TABLE A2
STATES WITH GENERAL COMPACTNESS STANDARDS

State	Compactness Language	Source
Alaska (SL)	Compact Territory	ALASKA CONST. art. VI § 6

(Mar. 25, 2011); Joint Reapportionment Committee Resolution No. 3, 3d Congressional District Criteria (Aug. 17, 2015).

49. Opinion & Order at 9, *Vesilind v. Va. State Bd. of Elections*, No. CL15-3886 (Va. Cir. Ct. May 31, 2017).

50. *Jamerson v. Womack*, 423 S.E.2d 180, 184 (Va. 1992).

Arizona (SL, C)	Geographically Compact	ARIZ. CONST. art. IV pt. 2 § 1(14)(c)
California (SL, C)	Geographically Compact & Cannot Bypass Population	CAL. CONST. art. XXI, § 2(d)(5)
Idaho (SL, C)	Odd Shape	IDAHO CODE § 72-1506(1)
Iowa (SL)	Compact Territory	IOWA CONST. Art. III, § 34
Maine (SL)	Compact Territory & Travel Impediments	ME. CONST. art. IV, pt. 1, § 2 ME. REV. STAT. tit. 21-A, § 1206-A
Maine (C)	Compact Territory	ME. REV. STAT. tit. 21-A, § 1206
Maryland (SL)	Compact Form	MD. CONST. art. III, § 4
Minnesota (SL, C) ⁵¹	Compact Territory	Hippert v. Ritchie, 813 N.W.2d 374 (Minn. 2012)
Nebraska (SL)	Compact Territory	NEB. CONST. art. III, § 5
Nebraska (SL, C)	Easily Identifiable and Under- standable	Legis. Res. 102, 102d Leg., 1st Sess. (2011)
New York (SL, C)	Compact Form	N.Y. CONST. art. III, §§ 4, 5
New York (SL, C)	Compact Form	N.Y. LEGIS. LAW § 93(2)(d) (McKinney 2018)
North Dakota (SL)	Compact Territory	N.D. CONST. art. IV, § 2
Rhode Island (SL)	Compact Territory	R.I. CONST. art. VII, § 1
Rhode Island (C)	Compact Territory	2011 R.I. Pub. Laws 388
South Dakota (SL)	Compact Territory	S.D. CONST. art. III, § 5
Vermont (SL)	Geographically Compact	VT. CONST. ch. II, § 13

51. The Minnesota Supreme Court convened a panel of five judges to draw state legislative and congressional districts. The panel adopted redistricting criteria that included compactness, even though Minnesota's constitution does not require compact districts. It is unclear at this time if the order of the panel will have precedential value for a future redistricting. See State of Minnesota Special Redistricting Panel A11-152, Order Stating Redistricting Principles for Plan Submissions (Nov. 4, 2011), <http://www.mncourts.gov/mncourtsgov/media/CIOMediaLibrary/2011Redistricting/A110152Order11-4-11.pdf> [<https://perma.cc/FHT7-ZD77>]; see also *id.* at 8 (characterizing *Reynolds v. Sims*, 377 U.S. 533 (1964), as “stating that a legitimate redistricting principle is to provide for compact districts of contiguous territory”).”

Virginia (SL, C)	Compact Territory	VA. CONST. art. II, § 6 ⁵²
Wisconsin (SL)	Geographically Compact	WIS. CONST. art. IV, § 3

Two states speak of compactness in terms of districts' visual shapes. Idaho's statutes instruct map drawers to "avoid drawing districts that are oddly shaped."⁵³ Nebraska's legislature issued further guidance on the state's territorial compactness requirement through a 2011 legislative resolution stating that districts must be "easily identifiable and understandable to voters." While such resolutions cannot bind future legislatures, this phrase also appears in a 2001 resolution and has thus become a norm.⁵⁴

Two states provide further qualifications to compactness. California's constitution considers population for congressional and state legislative districts. It provides that "districts shall be drawn to encourage geographical compactness such that nearby areas of population are not bypassed for more distant population."⁵⁵ California might thus favor compactness measures that compute how widely dispersed people are who live within a district. Maine's statutes provide guidance on the state's constitutional compactness requirement by emphasizing travel distances: "a 'functionally contiguous and compact territory' is one that facilitates representation by minimizing impediments to travel within the district."⁵⁶

C. States with a General Compactness Requirement

Eighteen states have a general compactness requirement for congressional or state legislative districts. This Essay defines a general compactness requirement as one where the word "compact" appears alone, without any modifier. Even when a conjunction may link compactness to a class of compactness measures, this Essay favors classifying states as having a general compactness requirement. For example, North Dakota's constitution requires state legislative districts to be "of compact and contiguous territory";⁵⁷ Montana and Pennsylvania use similar

52. The Virginia Constitution's compactness language of "compact and contiguous territory" is restated in VA. CODE ANN. § 24.2-305 (2019).

53. IDAHO CODE § 72-1506(4) (2019).

54. Legis. Res. 102, 102d Leg., 1st Sess. (2011); Legis. Res. 7, 97th Leg., 1st Sess. (2001).

55. CAL. CONST. art. XXI, § 2(5).

56. ME. STAT. tit. 21-A, § 1206-A (2019).

57. N.D. CONST. art IV, § 2

wording.⁵⁸ This Essay classifies this phrasing as a general compactness requirement, by interpreting the word “compact” to be distinct from the phrase “contiguous territory.” I acknowledge, a reasonable person may construe that the words “compact” and “contiguous” apply to the word “territory.” Contrast this phrasing with Alaska’s “contiguous and compact territory,” where “compact” clearly modifies “territory.”⁵⁹ The importance of this distinction is that if compact does not modify territory, then that permits a wider range of allowable compactness measures that may take into account considerations such as population locations and travel distances.

TABLE A3
STATES WITH A GENERAL COMPACTNESS REQUIREMENT

State	Source
Alabama (SL, C)	Reapportionment Committee Guidelines (2011)
Florida (SL)	FLA. CONST. art. III, § 21(b)
Florida (C)	FLA. CONST. art. III, § 20(b)
Hawaii (SL)	HAW. CONST. art. IV, § 6(4)
Hawaii (C)	Haw. Rev. Stat. § 25-2(b)
Illinois (SL)	Illinois art. IV, § 3(a)
Kansas (SL, C)	Kansas Legislative Research Department, Guidelines and Criteria for 2012 Kansas Congressional and Legislative Redistricting (2012)
Mississippi (SL)	MISS. CODE ANN. 5-3-101(a) (West 1981)
Missouri (C)	MO. CONST. art. III, § 45
Missouri (C)	MO. CONST. art. III, § 2
Montana (SL)	MONT. CONST. art. V, § 14(1)
New Jersey (SL)	N.J. CONST. art. IV, § II(3)
New Mexico (SL)	N.M. CODE R. §§ 2-7C-3; 2-8D-2 (LexisNexis 1978)

⁵⁸ MONT. CONST. art. V, § 14(1); PA. CONST. art. II, § 16.

⁵⁹ ALASKA CONST. art. VI, § 6.

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New Mexico (C)	Guidelines for the Development of State and Congressional Redistricting Plans, N.M. Legislative Council (2011)
North Dakota (SL)	N.D. CONST. art. IV, § 2
Ohio (SL)	OHIO CONST. art. XI, § 6(C)
Oklahoma (SL)	OKLA. CONST. art. V, § 9A
Pennsylvania (SL)	PA. CONST. art. II, § 16
South Carolina (SL, C)	Colleton Cty. Council v. McConnell, 201 F. Supp. 2d 618, 647 (D.S.C. 2002), <i>opinion clarified</i> (Apr. 18, 2002)
Washington (SL, C)	WASH. CONST. art. II, § 43(5)
West Virginia (SL)	W. VA. CONST. art. VI, § 4
West Virginia (C)	W. VA. CONST. art. I, § 4
Wyoming (SL)	Joint Corporations, Elections and Political Subdivisions Interim Committee Redistricting Principles, State of Wyoming Legislature (2011)

Three states adopted compactness requirements in legislative resolutions guiding redistricting. South Carolina's legislature adopted a resolution that cited a compactness standard found in a 2002 court decision, *Colleton County Council v. McConnell*.⁶⁰ Its compactness requirement may therefore have more permanence than the compactness requirements in the Kansas and Wyoming legislative resolutions.

60. 201 F. Supp. 2d 618, 647 (D.S.C. 2002), *opinion clarified* (Apr. 18, 2002).