NCLCV v. Hall
21 CVS 15426
LDTX169

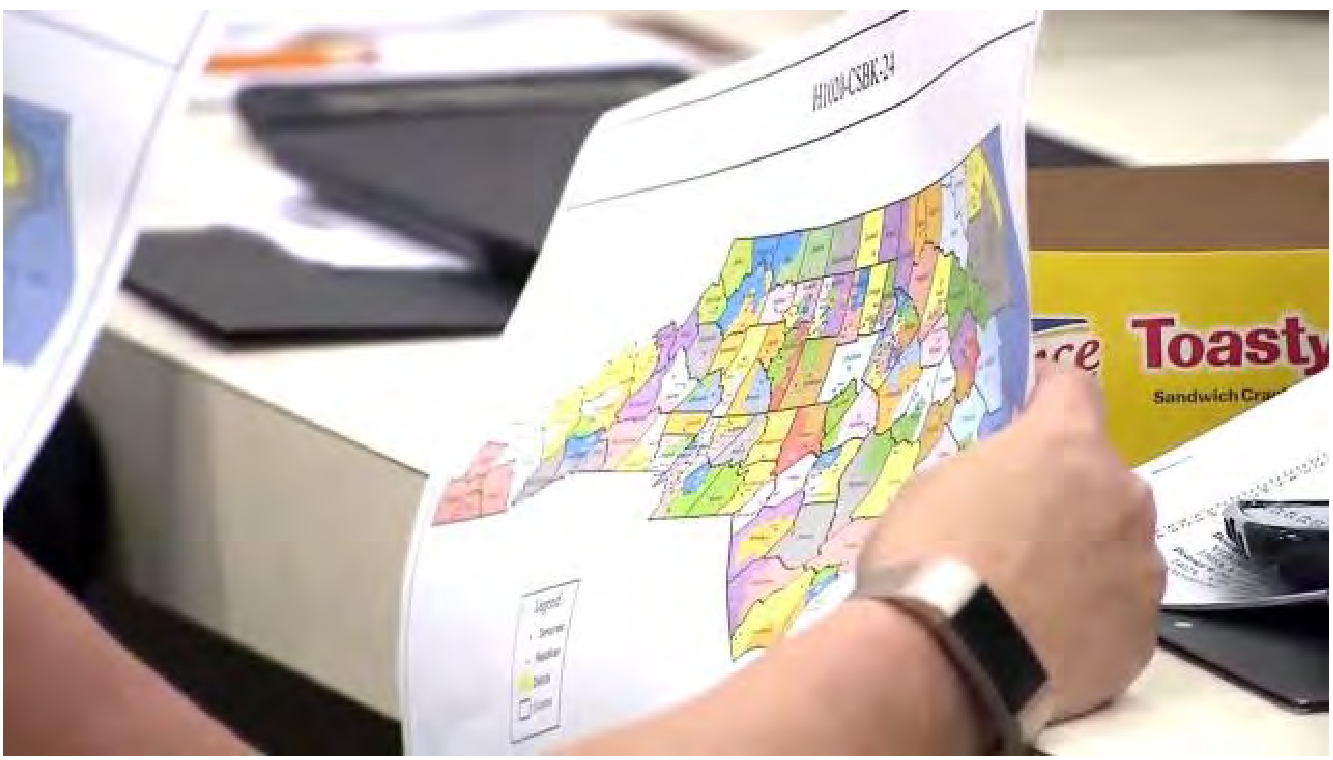
NC CAPITOL

From plausible to insulting, election experts weigh in on NC voting district maps

Tags: redistricting, Congressional redistricting, NCCapitol

Posted November 11, 2021 6:00 a.m. EST

Updated November 11, 2021 8:52 a.m. EST



By Travis Fain, WRAL statehouse reporter

Exhibit #
Taylor 01
12/31/2021
exhibitsticker.com

RALEIGH, N.C. — The rules Republican lawmakers came up with to guide this year's redraw of North Carolina congressional and legislative district maps forbade them from using election results or "partisan considerations" in the drawing.

And Republican lawmakers in the House and the Senate said last week they complied with those guidelines.

So, what are the chances, in a place where statewide elections ping-pong between Republicans and Democrats, that lawmakers managed to draw state House and Senate maps that protect Republican majorities – plus a congressional map likely to elect 10, and maybe 11, Republicans out of 14 U.S. House districts – without this data to guide them?

"Very long odds indeed," said Walter Olson, a senior fellow at the Cato Institute, a Libertarian think tank in Washington, D.C.

"Do they think we're stupid?" said Steven Greene, a political science professor at North Carolina State University

WRAL News reached out to 10 political scientists, mathematicians, attorneys and redistricting experts, inside and outside of North Carolina, attached to organizations with varied political leanings, to ask one question: Was it possible to draw these districts without election or partisan data?

Their answers fell into three basic buckets: surely not, surely they could and maybe.

Catawba College political science professor Michael Bitzer posited that consultants looked at political data and fed lawmakers pre-drawn maps, pulling an end-run around the prohibition. Bitzer, a long-time observer of North Carolina politics and its redistricting battles, said that's his theory "until proven or shown otherwise, which I'm sure will come out in some kind of evidentiary hearing or deposition."

Indeed, there will be hearings and depositions. Two lawsuits already have been filed challenging the maps. More could come.

Republican leaders say no such tactics were employed.

"Republican lawmakers did not use any consultants in drawing or preparing to draw the maps," Pat Ryan, a spokesman for Senate President Pro Tem Phil Berger, said in an email. "No consultants were involved in the map-drawing process, period."

Dylan Reel, a spokesman for House Rules Chairman Destin Hall, who oversaw map drawing in the House, said the same thing: "No consultants were involved, period."

Another theory for some: Lawmakers are so familiar with voters' leanings that they don't need detailed election data to gerrymander a map. They can do it from memory.

“Clearly, they go into map-drawing knowing stuff about certain areas,” said Andrew Taylor, another N.C. State political science professor.

“Obviously, you could create maps with greater precision (with that data). … But the reality is map makers have been gerrymandering for a long time,” said Michael Li, senior counsel for the left-leaning Brennan Center for Justice’s Democracy Program in New York.

Bitzer said this doesn’t explain the lopsidedness Republicans came up with.

“We can look at a map and generalize in distinct areas, but when you get down to putting this precinct here and that precinct there … maybe some refresher information might be helpful,” he said.

Minority lawmakers likely to lose out under partisan NC district maps

Several experts said it’s entirely possible to draw these Republican-favoring districts without hard data, even in a state politically divided enough to bounce between the two major parties in statewide elections.

“Not only is it possible, but it’s also probable,” said Charles Blahous, senior research strategist at the Mercatus Center at George Mason University, in Fairfax, Va.

“It is very plausible,” said David McLennan, a Meredith College professor and director of the Meredith Poll.

The way people have sorted themselves – liberals living in cities, conservatives in more rural areas – makes it simple, McLennan and others said.

This is not the same thing as saying there was no partisan intent.

“Greensboro, for example, has been trending Democratic, so cracking Greensboro voters into three different congressional districts easily dilutes Democratic chances for winning a congressional seat in that area,” said McLennan, a frequent WRAL contributor.

Andy Jackson, director of the Civitas Center for Public Integrity, part of the conservative John Locke Foundation, said there are, potentially, other explanations for the ways Republican lawmakers drew the maps. Keeping cities together, for example, yields C-shaped districts in the unincorporated areas.

“You’ve got a neutral criteria (that could explain it),” Jackson said. “Anything beyond that, you’re having to get into people’s heads.”

Many turned to math in their analyses, and particularly work at Duke and Princeton universities, where researchers created a universe of potential maps for the state. Compare those millions of maps, and you see the outliers. See the outliers, and one could divine intent.

“The set of a million alternative maps that were drawn following redistricting rules but without partisan considerations and election results yielded a distribution that shows 11-3 and 10-4 are outliers,” said Ari Goldbloom-Helzner, a computational research analyst at Princeton.

Put another way: “Nearly impossible for the congressional map in North Carolina to look the way it did via blind redistricting,” said Doug Spencer, a University of Colorado professor in election law.

Olson, at the Cato Institute, said much the same thing: “The chances that a process truly blinded to politics would have resulted in this combination of maps appears infinitesimal.”

Li, at the Brennan Center, called North Carolina’s new congressional map “breathtakingly brazen.”

“I’ve watched this around the country,” he said. “In other places, Republicans have been a little bit more modest. ... In North Carolina, Republicans have said, 'We’ll go back to the buffet. We’ll grab a little more.'”

NC CAPITOL

Sign up for daily @NCCapitol emails for the latest updates on North Carolina politics!

Email address SUBMIT

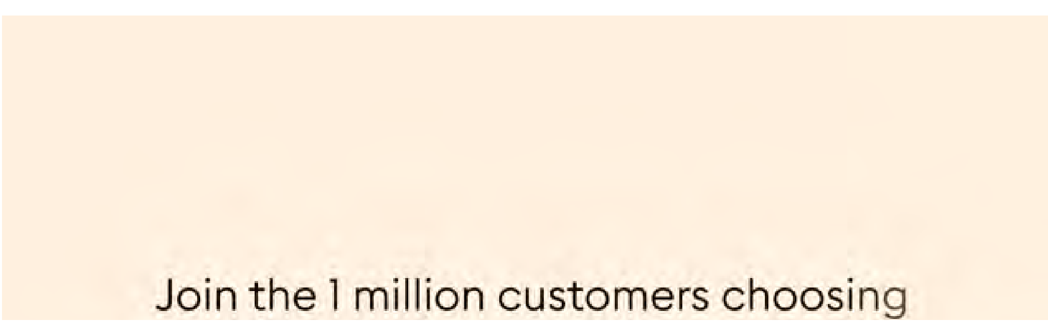
RECOMMENDED

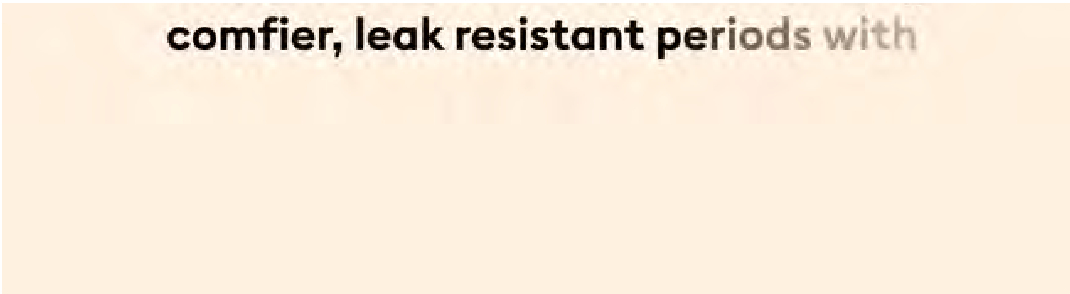
SPONSORED CONTENT

High Paying Cash Back Cards Have Hit The Market

By Wise Bread

AD





Tags: redistricting, Congressional redistricting, NCCapitol

CREDITS

Reporter Travis Fain

Web Editor Matthew Burns

Copyright 2021 by Capitol Broadcasting Company. All rights reserved. This material may not be published, broadcast, rewritten or redistributed.

CAROLINA JOURNAL

OPINION: DAILY JOURNAL

Redistricting, gerrymandering, and legislating from the bench

Andy Taylor
in Daily Journal

October 17, 2019
1:00AM

I have written about gerrymandering in these pages before, but the recent Superior Court ruling that the state's legislative districts constitute an unconstitutional partisan gerrymander makes me want to do it again.

This is a prime example of judicial overreach and regrettable encroachment of quantitative social science into legal decision making. I don't think there's any doubt the state legislative map in question was a gerrymander in the technical sense of the word — that is, the maps were drawn by legislators intent on maximizing their party's representation in the General Assembly. But how on earth did the court see it as violation of the N.C. Constitution?

I'm not going to take on the arguments about whether the plaintiffs enjoyed legal standing or gerrymandering is justiciable. Let me focus on the court's proposition that the map in question violates three important elements of the state's constitution: Its "equal protection," "free elections," and "free speech" and related "free assembly" provisions.

NCLCV v. Hall
21 CVS 15426
LDTX170

Exhibit #
Taylor 02
12/31/2021
exhibitsticker.com

First: How does a partisan gerrymandering treat voters unequally? Everyone gets one vote. All voters in the jurisdiction get the same ballot. Of course, outcomes are always unequal, some voters will select winners, others losers regardless of the district's composition.

In fact, if voting rights are so sacred and should be weighted equally, the U.S. Supreme Court needs to reverse its 2016 ruling in *Evenwel v. Abbot*. In this case it upheld legislative districts should be the same size by total population, not number of eligible voters. This is how you "dilute" votes.

Next, all the things that seem to impinge on "free elections" as generally understood have nothing to do with gerrymandering. These include registration and voter ID requirements, interminable lines at the polls, a limited choice of candidates, and little or distorted information about the contest.

Finally, the free speech and assembly arguments are just as contorted. Any restrictions on political speech and organization — such as campaign finance rules, municipal ordinances concerning protesting, etc. — are also unrelated to map-drawing. People are of course members of political minorities all the time, just ask the Libertarians. Don't like it? Make your party more appealing or switch allegiances.

To demonstrate how these are not free, fair, or equal elections, the court used a favorite phrase of the anti-gerrymander crowd; that politicians are choosing voters rather than the other way around. I hate to be snarky, but that is what districting is. Legislators don't choose the candidates, either. The state's filing rules are very relaxed, and we also have primary elections for party nominees. A "sweetheart" gerrymander, one in which all incumbents regardless of party are safe and happy, is a clearer sign legislators as a class are "selecting their own voters". As "double-bunking" — districts pitting incumbent against incumbent — and many preemptive retirements demonstrated, this was not the case with the map under consideration.

Predictably, the court fell back on a fictitious right to choose representatives in competitive elections to bring about proportional outcomes — or where the shares of a party's seats in a legislature and total vote are roughly the same. But it showed tremendous ignorance of how to produce such a system. The concepts of competition and proportionality are different and often inversely correlated.

Take for example a 100-seat legislature in a state evenly divided between Democrats and Republicans. We could plausibly create 100 50-50 seats and all would be highly competitive. But a small swing toward one party might give us something close to a 100-0 legislature, in which the governing party only got, say, 53% of the vote. We can ensure total proportionately with 50 100% Democratic districts and 50 100% Republican districts. Now that's a partisan gerrymander. By the way, does Massachusetts have free congressional elections in which Republicans regularly get about 35% of the statewide vote but no seats?

Why do the maps get blamed for the kinds of outcomes the court believes are harmful? Why don't parties just nominate candidates appealing to a district's voters? In the 1960s and 1970s, both Democrats and Republicans could win in just about any kind of place. The court's allies say partisan gerrymanders cause polarization. If so, why is the U.S. Senate so polarized? In fact, homogenous districts in heterogeneous states can force the parties to run a diverse slate of candidates and therefore reach out to many different political interests.

The legislature's motive, maligned by the court, is irrelevant as well. The district maps were legislation. Give me an example of a vote on important matters of public policy —including those affecting voting and other constitutional rights — where lawmakers aren't driven by partisan considerations.

I find partisan gerrymanders distasteful. But the court has taken a legitimate technical definition of the practice built on solid social science and forced it into law. That is legislating from the bench. There is now a similar case against North Carolina's congressional districts. Get ready for more.

Andy Taylor is a professor of political science at the School of International and Public Affairs at N.C. State University. He does not speak for the university.

categories: **Civil Society**, **History**, **North Carolina**, **Opinion**, **Politics & Elections**

tags: **Evenwel v. Abbot**, **gerrymandering**, **n.c. constitution**, **N.C. General Assembly**

Home
Explore
Notifications
Messages
Bookmarks
Lists
Profile
More
Tweet

← **Tweet**

Andrew J. Taylor
@ajtfosp

I see @will_doran has @newsobserver story quoting @chriscooperwcu on partisan gerrymandering. Why, despite, a NC court ruling to the contrary, I believe partisan gerrymandering is NOT unconstitutional.

carolinajournal.com
Redistricting, gerrymandering, and legislating from the benc…
I have written about gerrymandering in these pages before, but the recent Superior Court ruling that the state's legislati…

6:05 PM · Jan 12, 2021 · Twitter for iPhone

1 Retweet **1** Quote Tweet **5** Likes

Tweet your reply

Will Doran @will_doran · Jan 12
Replying to @ajtfosp @newsobserver and @chriscooperwcu
I remember reading this when it first published. Need to review again now that we're getting closer to doing it all over! Thanks for re-sharing it
2

Search Twitter

Relevant people

Andrew J. Taylor
@ajtfosp
Prof Political Scienc Free & Open Societ matter of professio my own, RTs not ne endorsement

Will Doran
@will_d... Follows y
Writing about NC p @newsobserver. D story ideas and fun newsobserver.com/

The News & Obse
@newsobserver
The News & Obser best news, sports a Raleigh, Durham, C central and eastern Part of @mcclatchy

What's happening

News · Last night
Image of a purported New Times headline is fabricate the article does not exist, f checkers say

#Sing2
In theaters now. Get tickets.
Promoted by Sing 2

Only on Twitter · Trending
Merry Crisis
9,952 Tweets

Trending
The Stand
120K Tweets

COVID-19 · LIVE
COVID-19: News and upda North Carolina

Show more

Terms of Service Privacy Policy Accessibility Ads info More ···
© 2021 Twitter, Inc.

NCLCV v. Hall
21 CVS 15426
LDTX171

Exhibit #
Taylor 03
12/31/2021
exhibitsticker.com

Allison Riggs
@AllisonJRiggs

Messages

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
21 CVS 015426

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, et al.,

REBECCA HARPER, et al.,

Plaintiffs,

vs.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

Consolidated with
21 CVS 500085

AFFIDAVIT OF ANDREW J. TAYLOR

Now comes affiant Andrew J. Taylor, having been first duly cautioned and sworn, deposes and states as follows:

1. I am over the age of 18 and am competent to testify regarding the matters discussed below.

2. For the purposes of this litigation, I have been asked by counsel for Legislative Defendants to analyze relevant data and provide my expert opinions.

3. To that end, I have personally prepared the report attached to this affidavit as Exhibit A, and swear to its authenticity and to the faithfulness of the opinions.

FURTHER THE AFFIANT SAYETH NAUGHT.

Exhibit #
Taylor 04
12/31/2021
exhibitsticker.com

NCLCV v. Hall
21 CVS 15426
LDTX172

Executed on 22 December, 2021

Andrew J. Taylor

Sworn or affirmed before me and subscribed in the presence the 22nd day of December, 2021, in the state of NC and County of Wake.

CHRISTINE A. MCCAFFREY
Notary Public, North Carolina
Wake County
My Commission Expires
May 08, 2024

Notary Public

Exhibit A:

Expert Report of Dr. Andrew J. Taylor, Ph.D.

Dr. Andrew Taylor
North Carolina State University
Professor- School of Public and International Affairs
Caldwell Hall 277B
Raleigh NC 27607
ataylor@ncsu.edu

TABLE OF CONTENTS

I. Introduction and Qualifications

I have been hired by the legislative defendants to provide expert testimony in the consolidated cases of *Harper et al v. Hall et al* and *North Carolina League of Conservation et al v. Hall et al*. More specifically, I have been asked by the legislative defendants to provide my opinion regarding the congressional and state legislative districting plans enacted by the North Carolina General Assembly in 2021 deploying my knowledge of North Carolina political history and legislative politics, comparative politics, and American national and state politics and policy.

I am a tenured professor of political science at North Carolina State University. I received my Ph.D. from the University of Connecticut in 1995 and have taught at NC State for the 26 years since then—the past fourteen as a full professor. I teach an array of courses in American politics and served as chair of the Department of Political Science from 2006 to 2010 and President of the North Carolina Political Science Association in 2012-13. I have written four books and published extensively in political science journals. I have authored 28 peer-reviewed articles and numerous book chapters, reports, and other published work.

I have expertise in political science matters related to these cases. I use a diverse array of methodologies in my work, including different statistical techniques. I have been interviewed by scores of media outlets about issues relating to redistricting and North Carolina politics and policy and given dozens of talks to political and civic groups on these topics over the past quarter century. Some of my academic research analyses these matters. I believe the principal reason I have been hired as an expert in these cases is that my extensive experience and broad interests in American, North Carolina, comparative, and state politics enable me to offer an integrated and panoramic social scientific understanding of the large and complex questions before the court. My CV, which lists my complete credentials, is attached to this report as Appendix A.

The analyses and opinions I provide in this report are based upon my education in social science methods and knowledge of the relevant academic literature. These skills are well-suited to this analysis. My conclusions stated herein are based upon my review of the information available to me at this time. In my professional judgment this is sufficient basis for my opinions notwithstanding the unusually short period I have been given to write this report. I reserve the right to alter, amend, or supplement these conclusion based upon further study or based upon the availability of additional information and within the confines of the court's truncated scheduling order. I am being compensated for my time in preparing this report at the rate of $425/hour. My compensation is in no way contingent on the conclusions reached as a result of my analysis. The opinions in this report are my own, and do not represent the view of North Carolina State University.

II. Executive Summary

The substantive part of the report is divided into five sections: "The Redistricting Process in North Carolina in 2021", "*Common Cause v. Lewis* and the Constitution of the State of North Carolina", "Proportionality, Competitiveness, and the Properties of a 'Partisan

Gerrymander'", "Additional Conceptual and Analytical Considerations", and "A Recent History of North Carolina Party Politics". My findings are:

i. Regarding the process used by the North Carolina General Assembly to conduct redistricting in 2021.

- Compared to those of other states, the Constitution of North Carolina provides its state legislature with considerable authority and latitude in the formation and enactment of district plans.
- In 2021, the state legislature deployed a process that was comparatively transparent, open, and participatory.

ii. Regarding the case of *Common Cause v. Lewis*, the Constitution of North Carolina, and the plaintiffs' related claims.

- The constitutional provisions that describe Article I rights the plaintiffs believe to have been violated in these cases by the enacted plans—"the free elections" clause, "the equal protection" clause, "the freedom of speech" clause, and "the freedom of assembly" clause—are derived from practices and ideas unrelated to concerns about partisanship and redistricting.
- Political scientists' common understanding of the concept of a "partisan gerrymander" is different from the discipline's understanding of free elections, equal elections, the freedom of speech, and the freedom of assembly.

- Political scientists consider many other political rights that states, including North Carolina, restrict to be constitutive of free elections, equal elections, the freedom of speech, and the freedom of assembly—common burdens on these rights include ballot access, voter registration rules, fair access to the media, campaign finance regulations, etc.

iii. Regarding methods and principles used by political scientists to identify a "partisan gerrymander".

- The plaintiffs wish to see different qualities in the enacted plans particularly proportionality and district competitiveness, but these are often contradictory and elusive and proportionality, at least, is not intrinsic to our electoral system.
- The various methods political scientists use to evaluate district plans generate different results and, in turn, conclusions regarding the extent to which a plan is a "partisan gerrymander"—that is, the choice of method can be determinative of an investigator's assessment.
- "Partisan gerrymandering" is an abstract and complex political science concept that defies clear standards for decisive analysis.

iv. Regarding additional analytical and conceptual challenges facing political scientists as they evaluate district plans.

- There exists a "natural gerrymander" created by the uneven distribution of the general population across the state and within crucial units of redistricting such as counties, voting tabulation districts (VTDs), and "communities of interest" and the concentration of Democratic voters in urban areas and Republican voters in rural areas.

- The choice of "baseline" statewide elections to evaluate the partisan nature of district plans is arbitrary and can have material effects on the assessment of a plan.
- Terms like "community" are vague and of little practical utility to political scientists offering a principled and objective analysis of enacted district plans.

v. Regarding North Carolina party politics.

- The geographic character of the North Carolina Democratic and Republican parties' support has changed dramatically over the past thirty years, with implications for electoral competitiveness.
- Much of this is a function of discretionary decisions made by state and national party leaders, elected officials, and activists and very little of it can be attributed to redistricting practices.

III. The Redistricting Process in North Carolina in 2021

i. Method

In this section, I use my knowledge and a survey of the academic literature to analyze the manner in which the General Assembly conducted the redistricting of North Carolina's congressional and Senate and House districts in 2021, a matter the plaintiffs in *Harper* and *NCLCV* have placed at the center of their complaint. The approach, typical in political science, is to place the legislature's actions in historical and comparative state perspective.

ii. Constitutional Context

The U.S. Bureau of the Census released data to the states so that they could begin their redistricting on August 12, 2021 (they were released in easier-to-use form on September 16). This was much later than initially intended (the original statutory deadline to complete delivery of redistricting was March 31, 2021) because of the coronavirus pandemic and data anomalies. Under the authority of the Constitution of the State of North Carolina (Article II §§3, 5), the North Carolina General Assembly has the responsibility to redraw district lines for the state's U.S. House districts and state legislative districts. This power is the General Assembly's alone. It must exercise this "at the first regular session convening after the return of every decennial census of population taken by order of Congress following the decennial national census". It cannot avoid the charge. For both the congressional and state legislative maps, unlike roughly half of the states, North Carolina law grants authority to enact district plans to neither non-partisan institutional legislative staff nor a commission with all or some members who are either non-legislators or appointed by officers outside of the legislature.[1]

Moreover, Article II, § 22 of the Constitution states redistricting plans are not ordinary legislation. Like Connecticut, Florida, Maryland, Mississippi (in the case of the

[1] The Constitution mentions congressional redistricting only in passing in Article II, § 22 (5) (c). Here it states the congressional district plan is a bill not subject to gubernatorial amendment.

state legislature) and Connecticut (in the case of Congress), the maps are not presented to the Governor. The executive cannot exercise its veto power.[2] But even in these other states, the legislature's power to devise plans is limited somewhat. In Connecticut, a two-thirds majority of both chambers is needed to approve plans and if the legislature misses statutory deadlines a nine-member back-up commission is charged with drawing the maps. In Maryland, the Governor submits a map the legislature can ignore, but if the legislature misses a legal deadline back-up procedures take effect and its power to draw the plan is consequently curtailed. Ultimately, the Governor's plan is enacted absent the legislature approving theirs. Mississippi has a back-up commission consisting of non-legislative members.

In drawing its state legislative districts, Florida uses a process most like North Carolina's. There, however, state legislative district maps are automatically submitted to the Florida Supreme Court for approval. In the event that the court rejects the lines, the legislature is given a second chance to draft a plan. If the legislature cannot approve a state legislative redistricting plan, the state attorney general must then ask the state supreme court to draft one. It is only in North Carolina that the legislature expressing its will through a simple majority vote in both chambers has sole authority under state law to

[2] The people approved an amendment to the Constitution bringing about the executive veto in 1996. Legislative Democrats were generally against the proposal. Governors, particularly Jim Martin and Jim Hunt, and legislative Republicans were in favor. A compromise was struck in which, unlike a large majority of the states' governors, North Carolina's governor would not have the line-item veto. Veto overrides would also require only a vote of three-fifths of members of both legislative bodies (most states require two-thirds) and redistricting legislation would not be subject to the veto (Christensen 2008, 246; Fleer 1994, 115-6; *New York Times* 1995).

draw congressional and state legislative maps.[3] These rules were affirmed when the current Constitution was written in 1971, a time when the Democratic Party enjoyed large and electorally-secure majorities in the General Assembly.[4]

The mandates that limit the North Carolina legislature's discretion are therefore unrelated to process. They concern the content of the maps and are directed by federal and state statutory and constitutional law and court decisions. Many of them were recited by the "Criteria Adopted by the Committees" approved at a joint meeting of the General Assembly's House Committee on Redistricting and Senate Committee on Redistricting and Elections on August 12, 2021.[5] I will return to them throughout the report. Probably the most important are that the districts be single-member and contain equal population, be contiguous and compact in shape, minimize the traversal of county lines and splitting of voting tabulation districts (VTDs or essentially precincts or wards), and be sensitive to what are frequently called "communities of interest".[6]

[3] There are a number of reputable and comprehensive reference sources for this information freely available on the Internet. These include the site of the National Conference of State Legislatures (https://www.ncsl.org/research/redistricting.aspx), the site of academics Justin Levitt and Doug Spencer (https://redistricting.lls.edu/), and the Princeton Gerrymandering Project (https://gerrymander.princeton.edu/). The Congressional Research Service's report, "Congressional Redistricting 2021: Legal Framework" (https://crsreports.congress.gov/product/pdf/LSB/LSB10639) provides a nice overview to the role of federal law in the process.

[4] The Constitution of 1971 was "an extensive editorial revision of the entire constitution incorporating relatively noncontroversial substantive changes without altering the fundamental character of the document" (Fleer 1994, 51). Proposed changes regarding executive power were rejected by the people.

[5] https://www.ncleg.gov/documentsites/committees/Senate2021-154/2021/08-12-2021/Criteria.adopted.8.12.pdf

[6] In 2021, there are 14 U.S. House districts apportioned by federal law and 50 state Senate and 120 state House districts as directed by Article II §§2, 4 of the Constitution of North Carolina.

For the 2021 redistricting cycle, the House and Senate redistricting committees did adopt criteria concerning the configuration of the maps, however. These criteria were more stringent than those of 2011 and presumably recommended to the committees by legislators' understanding of federal and state law and court decisions and in anticipation of potential legal challenges to the congressional and state legislative district plans. Most notably, the committees prohibited the use of election-result data and data identifying the race of individuals. In *Cooper v. Harris* in 2017, the U.S. Supreme Court ruled that in drawing two congressional districts after the 2010 census, the North Carolina General Assembly used race as "the predominant factor", an action that did not survive the "strict scrutiny" jurisprudential standard.[7] In 2018, it essentially reiterated this in a case involving state legislative districts.[8] Legislators were also instructed this year not to use "partisan considerations". In *Common Cause v. Lewis* in 2019, a three-judge Superior Court panel essentially ruled that drawing state district lines for the clear purpose of advantaging the majority party's interests violated the North Carolina Constitution.[9] Both *Cooper* and *Common Cause* resulted in the General Assembly having to draw remedial maps.

iii. Addressing the Plaintiffs' Claims

The plaintiffs claim the redistricting process was inadequate in some way. In the *Harper* complaint, they assert, "Legislative Defendants undertook an opaque and

[7] 137 S.Ct. 1455 (2017).
[8] *North Carolina v. Covington*, 138 S.Ct. 2548 (2018)
[9] 373 N.C. 258 (N.C. 2019).

constricted redistricting process”.[10] It would be fair to ask: Compared to what? Based upon my experience and extensive review, there exist no comprehensive systematic studies of how state legislatures have conducted their redistricting over the past several decades. Political science research has focused exclusively on the substance of maps. Indeed, a recent study in *Political Research Quarterly* on the determinants of state and federal redistricting cases omits any measure of the rules or procedures used by state legislatures in the formulation of district plans. The researchers focus on the form the maps take and political, social, and racial characteristics of states and find that, incidentally, among the variables generating a material effect are the size of the African-American population and the number of cases the state has been party to previously (Gimpel, Hightower, and Wohlfarth. 2021). This helps us understand why North Carolina has become the target of so many redistricting suits since 2010.

The National Conference of State Legislatures (NCSL) has observed, however, that before the 2010 cycle the processes used by state legislatures to draw congressional and state legislative maps were not unlike the processes used to write and approve regular legislation.[11] In North Carolina, both chambers of the General Assembly publish journals containing information about bills, amendments, and votes as per Article II, § 17 of the state Constitution. In recent years, citizens have been able to view and listen to live video and audio streams of proceedings on the General Assembly’s website. The website contains other information, including bills filed and notices of committee meetings. This

[10] Verified complaint in *Harper v. Hall*.
[11] https://www.ncsl.org/research/redistricting/into-the-thicket-a-redistricting-starter-kit-for-legislative-staff.aspx

is a dramatic improvement in terms of transparency on the situation prior to 2000 when the institution was considerably more opaque.

NCSL does observe a change from 2010. State legislatures are increasingly making the redistricting process transparent and participatory. The two practices most frequently used to facilitate this are "listening tours" and receiving district plan proposals directly from the public. These are both things the North Carolina General Assembly did in 2021. Although restricted by the coronavirus pandemic, the late release of the census data, and compressed timeline (an original filing deadline of December 17, 2021 and primary originally scheduled on March 8, 2022), the redistricting committees held 13 public hearings across the state and a further four over two days in October once maps had been proposed. This was in addition to the usual input members of the public are free to provide lawmakers on ordinary legislation.[12] The General Assembly also livestreamed proceedings on its website. It maintained a public redistricting workroom with a dedicated terminal that anyone could schedule to use. The maps citizens drew became part of the public record.

All members of the House and Senate had the opportunity to debate and then vote on three readings of the three bills (SB 740 for the congressional plan, HB 976 for the state House plan, and SB 739 for the state Senate plan). In sum, with the exception of the dramatic use of a lottery machine to help determine the state legislative plans from among five alternatives, the 2019 court-ordered process to redraw maps was practically

[12] Article I § 12 of the Constitution permits the people "to instruct their representatives and to apply to the General Assembly for redress of grievances".

identical to the 2021 process, particularly with regards to public participation and the openness of committee and floor proceedings. Several Democratic state legislators characterized what happened in 2019 as exceptionally fair and transparent (Bitzer 2021, 136).

The final recorded votes on the third reading of the three 2021 redistricting plans were: Congressional plan 65-49 in the House and 27-22 in the Senate; state Senate plan 65-49 in the House and 26-19 in the Senate; and state House plan 67-49 in the House and 25-21 in the Senate.[13] As far as we know, none of the proceedings violated the state constitutional requirements in Article II, § 12, 17, 18, 19 that pertain to member responsibilities and rights in the consideration of legislation.[14]

The plaintiffs claim the maps were drawn as the result of "partisan considerations".[15] As with many high-profile votes in today's partisan American legislatures, the recorded votes were partisan and no Republicans voted against any of the maps and no Democrats voted in favor of any of them. The state Senate plan, however, was altered by two floor amendments offered by Democratic senators.[16] Moreover, regardless of the motivations for individual members' votes in this matter, the North Carolina General Assembly itself is not uniquely partisan and polarized. To date, in the 2021-22 session more than 75

---

[13] These votes can be found on the North Carolina General Assembly's website, https://www.ncleg.gov/Legislation/Votes/2021

[14] These have to do with members' oath to discharge their duties as legislators (Section 12), requiring the bodies keep a journal of their proceedings (Section 17), essentially permitting any member to oppose legislative action and have that opposition made public record (Section 18), and allowing for recorded votes (Section 19).

[15] Verified complaint in *Harper v. Hall*, p. 12.

[16] They were Sen. Natasha Marcus and Sen. Ben Clark.

percent of House roll-call votes and 80 percent of Senate roll-call votes have had in excess of 60 percent of members on one side. According to widely-cited research using roll-call and survey data from state legislatures and a recognized ideal-point estimation statistical technique to place individual legislators on a single liberal-to-conservative ideological dimension, the difference in median annual ideology scores between House Republicans and Democrats and Senate Republicans and Democrats from 2010-18 are just slightly higher than the national average (North Carolina House 1.64, other states' houses 1.63; North Carolina Senate 1.66, other states' senates 1.61). The North Carolina House has become more partisan and polarized according to these measures since 2010 (from 1993 to 2009 its mean difference score was 1.26, compared to the national 1.37) but the state's Senate has actually become less partisan and polarized (from 1993 to 2009 its mean difference score was 1.72, compared to the national 1.36) (Shor and McCarty 2011).[17]

IV. *Common Cause v. Lewis* and The Constitution of the State of North Carolina

i. Method

Here, I use my knowledge and experience as a political scientist and examine the comparative and historical political science literature to ascertain whether it is reasonable to argue, as the plaintiffs do, that the enacted plans are in violation of state constitutional provisions concerning "free elections", "equal protection", "freedom of speech", and

[17] Shor and McCarty's updated data can be found at: https://americanlegislatures.com/data/

"freedom of assembly". My opinion is not legal, rather I draw on these concepts as understood historically and by the political science literature to evaluate their relationship with the plaintiffs' assertions.

ii. *Common Cause* and the Plaintiffs' Complaints

In 2019, a three-judge panel of a Superior Court in Wake County ruled the 2017 state House and Senate district plans to be unconstitutional "extreme partisan gerrymanders". The essence of the decision in *Common Cause v. Lewis* was that the maps violated three state constitutional provisions: The "free elections" clause (Article I, §10), the "equal protection" clause (Article I, § 19), and, together, the "freedom of speech" and "freedom of assembly" clauses (Article I, § 14 and Article I § 12). The plaintiffs in *Harper* and *NCLCV* claim forcefully the district plans violate these provisions of the North Carolina Constitution.

The Court in *Common Cause* seemed to be taking its lead from a 2018 Pennsylvania decision. In *League of Women Voters of Pennsylvania et al v. Commonwealth of Pennsylvania et al*, the Supreme Court found that state's 2011 congressional district plan violated Article I, § 5 of its Constitution that asserts, "Elections shall be free and equal; and no power, civil or military, shall at any time interfere to prevent the free exercise of the right of suffrage."[18] In *Common Cause*, the Superior Court invoked North Carolina's "free elections" constitutional provision, despite its omission of the term "equal". Perhaps sensitive to the difference and to draw a more direct connection between the

[18] 178 A.3d 737 (Pa. 2018).

North Carolina and Pennsylvania situations, it asserted the plans before it were also in violation of the Constitution of North Carolina's Article I, § 19 guaranteeing "equal protection".

This reference to the equal protection clause is important. First, it should be noted the relevant provision reads that, "No person shall be denied the equal protection of the laws; nor shall any person be subjected to discrimination by the State because of race, color, religion, or national origin." There is no reference to anything remotely related to partisanship. Second, the part of the XIV Amendment of the U.S. Constitution the North Carolina provision mimics has almost exclusively been deployed in connection with government action that is considered discriminatory on the grounds of characteristics like gender, age, national origin, and, especially, race (Arazia 2018). It is interesting that all the plaintiffs in both cases introduce themselves as Democratic voters and most of the plaintiffs in *NCLCV* also present themselves as Black voters. The two characteristics, race and partisanship, should not be conflated. Race is an established constitutionally suspect category that receives strict scrutiny when states legislate on matters related to fundamental rights like voting. It is also a significant and explicit factor in federal restrictions on the redistricting process, such as those enumerated in the Voting Rights Act and the now established principle that, to use Justice Anthony Kennedy's descriptor in *Miller v. Johnson*, race cannot without justification be the "predominant" factor motivating the drawing of districts.[19] Partisanship, by contrast, is not innate, immutable, or central to a person's being. Voting for candidates of a particular party is a choice and

[19] 515 U.S. 900 (1995).

purely incidental to most people's lives. It is something that could be used to describe the class of people the plaintiffs consider "Democratic voters" for little more than a few minutes every two, perhaps even every four, years.

iii. The State Constitution and the Derivation of the Rights in Question

As the Court observed in *Common Cause*, the origins of several of the constitutional rights it invoked can be found far back in the state's history. It noted the source of the "free elections clause" is located in the North Carolina Declaration of Rights of 1776, which in turn borrowed it from the English Bill of Rights of 1689 (Orth 1992).[20] It also claimed North Carolina's embrace of free elections drew inspiration from language in other state constitutions, including Pennsylvania's.[21] The 1868 North Carolina Constitution, written following the Civil War, contained a "free elections clause" in its Article I §, 10—although the words "ought to" were in place of today's "shall".

If the origins of the provision go back to 1776, it was established prior to any meaningful American understanding of the term "gerrymander" which was largely popularized following the 1810 redistricting cycle when the Governor of Massachusetts Elbridge Gerry signed a state legislative district plan that was said to greatly favor his Democratic-Republican Party (Engstrom 2013, 21-22). In 1868, and even in 1971 when today's Constitution was established, the concept of a "partisan gerrymander" does not

[20] It should be noted, however, that it was not until the passage of the "Great" Reform Act in 1832 that Britain rid itself of "rotten boroughs", districts with very small constituencies that often elected members of parliament who were essentially selected by a single or small group of powerful residents (Evans 1994).
[21] *Common Cause v. Lewis*, 303.

appear to have been addressed or contemplated by convention delegates and the state's population. With the exception of the short "fusionist" period of the 1890s when Republicans had control of the General Assembly and the governorship, North Carolina was a solidly one-party state for more than a century following the Civil War. It was not until 1972 that North Carolina elected its first Republican Governor and U.S. Senator of the twentieth century and 1994 that it elected that party's first state legislative majority by giving Republicans control of the House.[22]

The same logic applies to the "freedom of assembly" provision. Article I, § 25 of the 1868 Constitution reads, "The people have the right to assemble together to consult for their common good, to instruct their representatives, and to apply to the Legislature for the redress of grievances". Given this was written in 1868, it seems difficult to imagine the authors were contemplating partisan gerrymandering as a practice in contravention of the freedom of assembly.

The "freedom of speech" wording was only written into the Constitution in 1971. It was tacked on to the beginning of the "freedom of the press" clause which occupied Article I, § 20 of the 1868 Constitution—and, like "free elections", the 1971 Constitution believed it "shall" as opposed to "ought" "never be restrained". Again, the origins suggest no intent to include the concept of a "partisan gerrymander".[23] In summary,

[22] Kruman (1983, 154) discusses partisan battles over redistricting in North Carolina between Democrats and Whigs in the early 1850s. The Civil War and the demise of Reconstruction, however, made North Carolina a solidly Democratic state.

[23] Today, Article I, § 14 reads, "Freedom of speech and of the press are two of the great bulwarks of liberty and therefore shall never be restrained, but every person shall be held responsible for their abuse."

based upon my review as a political scientist of North Carolina's political history, there seems no support for the drawing of a connection between the constitutional rights of free elections, equal protection, freedom of speech, and freedom of assembly on one hand and partisan redistricting practices on the other.

iv. State Constitutions and the "Partisan Gerrymander"

In fact, when states expressly wish to prohibit partisan gerrymandering, they establish laws to that effect. Academics Justin Levitt and Doug Spencer estimate 19 states have statutes or constitutional provisions restricting the practice of "undue partisanship" in state legislative redistricting, 17 have such statutes or constitutional provisions addressing congressional redistricting.[24] The following examples provide just a flavor of how this can be done if a state so desires. Article III, § 20 of the Florida State Constitution states, "No apportionment plan or individual district shall be drawn with the intent to favor or disfavor a political party." Article III, § 3 of the Missouri State Constitution states, "Districts shall be drawn in a manner that achieves… partisan fairness." The entire eleventh article of the Ohio State Constitution is devoted to redistricting and Section 6, Clause A states, "No general assembly district plan shall be drawn primarily to favor or disfavor a political party". Article IV, Part 2, § 1(14) of the Arizona State Constitution reads, "to the extent practicable, competitive districts be favored where doing so would not significantly detract from" criteria such as equal population, compactness, and the

[24] https://redistricting.lls.edu/redistricting-101/where-are-the-lines-drawn/#partisan+outcomes

protection of communities of interest. North Carolina has no constitutional provision related to the partisan make-up or competitiveness of districts.

Moreover, the U.S. Supreme Court ruled in 2019 in a case involving North Carolina that partisan gerrymandering was outside the ambit of the federal courts as a politically non-justiciable question.[25] As a result, therefore, state courts are left to determine whether their statutes and constitutions, absent a provision related to partisan redistricting practices, prohibit partisan gerrymandering. Prior to *Common Cause*, they had only done this definitively once, in the 2018 Pennsylvania case.

v. Political Science and the Concepts of "Free Elections", "Equal Elections", "Freedom of Speech", and "Freedom of Assembly"

As a political scientist, I find it hard to think of American practices of redistricting, regardless of how skewed in a partisan sense the outcomes seem, to be evidently inconsistent with the principles of "free elections", "equal elections", "freedom of speech", and "freedom of assembly". To explain, let me take each of these concepts in turn, beginning with "free elections".

Freedom House, a highly respected non-profit, non-partisan, non-governmental organization that conducts research and advocacy on democracy, political freedom, and human rights, clearly dislikes what it calls "partisan gerrymandering".[26] The

[25] *Rucho v. Common Cause*, 139 S.Ct. 2484 (2019). There was a companion case out of Maryland, *Benisek v. Lamone*, 139 S.Ct. 2484 (2019).
[26] See, for example, https://freedomhouse.org/sites/default/files/2021-03/US_Democracy_Report_FINAL_03222021.pdf

methodology it uses to conduct its “Freedom in the World” analysis, however, includes “partisan gerrymandering” specifically in response to the following question it asks of countries: “Are the electoral laws and framework fair, and are they implemented impartially by the relevant election management bodies?” The phenomenon is not used to evaluate how countries respond to this question: “Were the current national legislative representatives elected through free and fair elections?”[27] In the numerous political science reference materials that describe free elections, the key characteristics are things such as whether elections are called in a timely manner, candidates have access to the media, members of the public can vote without undue pressure or intimidation, ballots are cast in secret, and the vote count is transparent and timely.

The Economist’s *Democracy Index* which clearly places “free elections” at the heart of its understanding of democracy, makes no mention of redistricting in its methodology. Its unfortunate assessment in 2020 was that the United States is a “flawed democracy” noting that although “Americans have become much more engaged in politics in recent years” they show “low levels of trust in institutions and political parties, deep dysfunction in the functioning of government, increasing threats to freedom of expression, and a degree of societal polarization that makes consensus almost impossible to achieve”.[28] It is plausible some political scientists believe redistricting contributes to some of these outcomes, but there is a significant amount of research that casts doubt on the argument partisan gerrymandering is a principal cause of polarization in American politics—the

[27] https://freedomhouse.org/reports/freedom-world/freedom-world-research-methodology
[28] https://www.eiu.com/n/campaigns/democracy-index-2020/

dramatic polarization of the U.S. Senate furnishes crucial evidence in that regard McCarty, Poole, and Rosenthal 2009). Interestingly, the country's only non-partisan legislature, Nebraska's unicameral body, is also polarized. Here antagonistic legislative groups are galvanized by campaign contribution patterns and candidate recruitment processes that mirror states with formal partisan politics (Masket and Shor 2015).

In the American context, there are many other practices that vary considerably across states and are more integral to the concept of free elections than what is typically called a "partisan gerrymandering". These include rules related to voter access and election integrity such as registration and voter identification requirements, absentee and early voting rules, and the location and number of polling places. These freedoms are routinely regulated by state law and court decisions.

Freedom, moreover, infers choice. As a result, when assessing whether elections are free we should also consider the character of the ballot given to voters. Ballot access and candidate filing rules are crucial in this regard. So is the number of candidates on the ballot and the availability of accurate and useful information about each of them. If voters have very little freedom of choice in U.S. House and state legislative elections our electoral system is to blame. Much of the time they have only two alternatives, a Democratic or Republican candidate. Others desiring the label "Democrat" or "Republican" are forcibly eliminated from consideration by a primary and candidates from other parties are kept off the general election ballot by restrictive rules. Although the Libertarian Party has official standing in North Carolina, the only independent candidate to appear on a statewide election ballot here was Ross Perot in 1992.

What about "equal elections"? Each person has one vote to elect one legislator who has one vote in the legislature. More specifically, the existing restrictions on the redistricting process exist to ensure elections be equal. The choice of legislative candidates is the same for all voters in a district and, most importantly, the General Assembly must establish districts with equal or nearly equal populations. The law does currently tolerate tangible inequalities in elections, however. In the recent *Evenwel v. Abbott* case, the Supreme Court strongly advised states to conform to settled practice and draw their districts with equal population, not equal numbers of eligible voters.[29] Eligible individuals are also given different chances to vote by their registration status—you must be registered in order to vote. Other plausibly unequal treatment includes distance from the place of polling and the length of time it takes to vote once there.

Unequal outcomes are inherent to our winner-take-all or first-past-the-post single-member-districts electoral system—North Carolina cannot draw at-large or multi-member districts.[30] There is one winner in the election for each seat in the U.S. House and North Carolina House and Senate. If the election is contested, there is also at least one loser. The winner is selected by a plurality of voters in the district. The remaining voters who cast a ballot selected a loser.

I will return to the notion of "wasted votes" and the related frequently used quantitative indicator of partisan gerrymanders, the "efficiency gap", later. But I think it

[29] 136 S. Ct. 1120 (2016).
[30] The intent was largely to protect the political interests of minorities. The case that ended multi-member districts in North Carolina was *Stephenson v. Bartlett*, 355 N.C. 354 (2002).

should be noted the plaintiffs also talk about certain citizens having their votes "wasted" and imply they are treated unequally. Wasted votes are those cast for the losing candidates or the winning candidate above those needed to win, in other words the difference in votes received by the winner and the second-place finisher minus one. Wasted votes are intrinsic to our system.[31] It is not, therefore, citizens who waste or do not waste votes when they register their choice of candidates on the ballot. They are exercising a fundamental right. It is the parties who waste them by winning seats by large margins or losing seats by slim ones.

My response to the argument the district plans violate the North Carolina Constitution's provisions regarding "free speech" and "free assembly" is similar. Political scientists do not conceptualize partisan gerrymandering in terms of the suppression of speech or the ability to organize freely. According to the *Oxford Concise Dictionary of Politics*, "freedom of speech" is the "liberty to express opinions and ideas without hindrance, and especially without fear of punishment" and "freedom of association" is "the freedom of individuals to associate as an end in itself or with the view to pursuing common projects, e.g. churches, trade unions, political parties, and sporting clubs" (McLean and McMillan 2003, 208-9). When they study legal restrictions on political speech and organization in the American context, political scientists examine

[31] If the goal had been to eliminate wasted votes, through their Constitution the people of North Carolina would have adopted a system of proportional representation in which seat shares are a faithful representation of the proportion of total statewide votes each party received. If the plaintiffs' intent is to provide "Democratic voters" the "opportunity… to elect the candidates of their choice in the districts and/or clusters where they reside" (Verified complaint in *NCLCV*, p. 12) then they should desire plans with highly uncompetitive districts where each individual Democratic voter is very likely to select the winner.

matters such as campaign finance, candidate nomination procedures, rules regulating canvassing, rallies, and protests, media entities' compliance with the federal requirement they provide equal time to any opposing candidates who request it, and so on. State laws that unfavorably treat citizens who wish to organize or vote for third or minor parties, such as those shaping the electoral system and restricting access to the ballot, are perhaps the most important examples. There are no restrictions on North Carolina Democrats' ability to assemble in the way they exist for North Carolina Constitution Party or Green Party members. As of early 2021, those two parties were no longer formally recognized by the state as political parties, consequently stripping them of numerous organizational advantages state Democrats (and Republicans and Libertarians for that matter) enjoy.

V. Proportionality, Competitiveness, and the Properties of a "Partisan Gerrymander"

i. Method

In this section, I deploy my knowledge of the political science methodology used to explore partisanship and redistricting. I survey the academic literature and explain and evaluate various principles and techniques.

ii. Political Science and Partisan Redistricting

The "partisan gerrymander" or manipulation of the redistricting process to bring about unfair partisan outcomes is an abstract political science construct. The concept has evolved over several decades with the contributions of many academics.[32] It lacks a

[32] For a good overview, see Burden and Smidt (2020).

precise operational definition. It seems to have a number of elements, although there is no consensus as to what these are and several appear to contradict each other. Unless investigators make personal and arbitrary decisions as to what principles to apply, it is prohibitively difficult to undertake a comprehensive comparison of a district plan to both others and some absolute desired standard.

Political scientists have tried to systematize an intellectual approach to the partisan gerrymander. In their efforts to facilitate real-world evaluation of district plans, they have created a series of indicators that purport to permit analysts to gauge the extent to which one is gerrymandered. Measures are generally interested in detecting something called "partisan bias", a broad gauge of whether a party received more seats than it should have given some exogenous standard of acceptability. Some emphasize proportionality or "responsiveness".[33] Beyond that, however, the indicators vary greatly. Some suffer measurement problems.

iii. Proportionality and Competitiveness

The arguments of critics of district plans, including it seems to me the *Harper* and *NCLCV* plaintiffs, are demonstrative of the intellectual minefield that is this effort to identify a partisan gerrymander. They often assert district plans have two important

[33] Both partisan bias and responsiveness focus on the "seats-votes curve" or the proportion of seats and votes won by a party when the two pieces of data are plotted against one another. Partisan bias is only concerned with the proportion of seats won when we place a party at 50 percent of the vote (this must be estimated using a computer algorithm), models interested in proportionality look at the entire curve. In both cases, significant asymmetry in the left and right hand sides of the curve (that is either side of 50 percent of the vote) is interpreted as a sign of a gerrymander.

deficiencies: They produce outcomes in which the share of the legislative body's seats won by a party is not proportionate with its share of the aggregate statewide vote and/or they produce too many districts where there is little meaningful competition between the major parties' candidates. Many of these critics, including the plaintiffs here who on several occasions complain the enacted plans' lack of proportionality and too few competitive districts, want maps to exhibit both qualities.

Before I examine the problems of trying to have a district plan exhibit both proportionality and competitiveness, I should emphasize proportionality was not an objective of the designers of our electoral system. Disproportionate outcomes in terms of seats are a feature not a bug. I have a deep knowledge of the modern political history and elections of the nation I grew up in, the United Kingdom. It has similar political values as the United States and an identical first-past-the-post plurality system of single-member districts for elections to its House of Commons. In the most recent general election of December 2019, the Conservative Party won 56.2 percent of the seats to form the government (legislative majority) with 43.6 percent of the vote. The Labor Party was second, but its 32.1 percent of the vote gave it 32.2 percent of the seats. The Liberal Democrats who received 11.6 percent of the national vote in third place won 1.7 percent of the seats while the Scottish National Party's (SNP) 3.9 percent of the vote secured it 7.4 percent of the seats. Labor's main response has been to change its leader and resolve to recruit better candidates and campaign more skillfully in districts it was defeated, especially those it lost narrowly or whose seats its members had occupied in the previous parliament. The Conservatives do the same when they are out of government. The

Liberal-Democrats have not bemoaned redistricting, but continue their long-standing efforts within the political process to make the electoral system more proportional. The SNP has retained its traditional strategy of focusing on its home base in Scotland's 59 districts.

As a practical matter, proportionality is not that important to the representation of the parties in government anyway. Our electoral system is described as "winner-take-all" for a reason. It is explicitly majoritarian. In *Common Cause*, the Court paid particular attention to the plaintiffs' argument that the plan made it very difficult for the Democrats to win legislative majorities.[34] It understood that in the General Assembly, majority status is of critical importance and the majority party sees rapidly diminishing returns from winning each additional seat beyond 26 in the Senate and 61 in the House. This is because both bodies are hierarchically organized giving great power to the leader of the majority party and, unlike the U.S. Senate with its filibuster for example, prohibit meaningful minority party obstruction (Cooper 2008). Moreover, the proportional distribution of seats in the North Carolina U.S. House delegation matters little to the overall partisan composition of Congress. North Carolina has only 14 of the 435 districts.

A central problem for critics of district maps like the plaintiffs in *Harper* and *NCLCV* is that proportionality and competitiveness are often incompatible. By trying to increase one, you can reduce the other, but not always in predictable ways. To

[34] *Common Cause v. Lewis*, p. 313.

understand this theoretically, consider a hypothetical state where we assert 50 percent of its voters are Democrats and 50 percent Republicans. The voters are distributed across the state in such a way we can draw very different types of maps. We can draw a map for a 100-member legislative body to ensure perfect proportionality. In this case, the plan would have 50 solid (perhaps even near 100%) "Democratic" districts and 50 solid "Republican" districts. No contests would be competitive. Alternatively we can draw 100 competitive districts, each with roughly half of its voters Democrats and the other half Republicans. Here, however, even a small statewide uniform swing towards one of the parties could result in it winning a very large majority even if the aggregate vote was something like 53 percent to 47 percent in its favor.

There are numerous illustrations of the tension between proportionality and competitiveness in American elections. The 2012 congressional elections immediately following the 2010 redistricting cycle furnish a good example. Nobody claimed the Massachusetts U.S. House plan in the 2010 cycle was gerrymandered; indeed the Center for Public Integrity gave it a grade of 'A'.[35] But in 2012 Republicans won 30 percent of the statewide vote and only one contest could reasonably be considered competitive. The party's candidate lost that race and Democrats captured all nine of the state's seats. In Iowa, where the non-partisan redistricting process produced maps after the 2010 census that in the 2012 congressional election resulted in a statewide 50 percent to 47 percent advantage for Republicans and an even split between the major parties of the four seats,

[35] See, https://publicintegrity.org/politics/state-politics/massachusetts-gets-c-grade-in-2012-state-integrity-investigation/.

no race was decided by less than nine percentage points. In Illinois in 2012, five of its 18 congressional districts were decided by less than ten points (a reasonable indicator of competitiveness these days), but the Democrats won two-thirds of them with 57 percent of the vote.

iv. Often-Cited Political Science Methods Used to Indicate a "Partisan Gerrymander"

Three of the most prominent measures political scientists use to explore the potential gerrymandered qualities of a district plan demonstrate the real-world challenge of accounting for different features like proportionality and competitiveness in a single indicator. The "efficiency gap" developed by Nicholas Stephanopoulos of the University of Chicago Law School and Eric McGhee a political scientist at the Public Policy Institute of California is a frequently used analytical tool in the investigation of district maps popularized when litigants and judges discussed it in the Wisconsin case that eventually became *Gill v. Whitford* decided by the U.S. Supreme Court in 2018 (Stephanopoulos and McGhee 2018). It takes the absolute difference in the total number of Democratic wasted votes and Republican wasted votes in a district plan and divides it by the total number of votes cast in all districts. Stephanopoulos and McGhee (2018) estimate that any figure in excess of about .08 (or eight percent) constitutes a partisan gerrymander in favor of the party with the fewest wasted votes. But the efficiency gap tends to punish competitiveness if the outcomes break decisively for one party. This is because parties waste a large number of votes in losing close elections and very few in winning them. Proportionality can also be penalized. Take a hypothetical legislature with five districts containing 100 voters each, where Republicans win 60 percent of the aggregate vote (300 votes) and three seats (60 percent). If the results were 85-15, 65-35, 65-35, 45-55, and 40-60 with Republican votes listed first, the efficiency gap would be .198 indicating a large gerrymander in favor of Democrats. Here the problem is parties waste a great deal of votes relative to their opposition when they win by large margins.

In the "mean-median difference" test, analysts subtract the median percentage recorded by a party's candidates in all of the districts in a plan from the mean percentage. When a party's median vote share is lower than its mean, it might be considered a victim of gerrymandering where its voters are unfairly concentrated (McDonald and Best 2015). But this approach does little to convey proportionality or competitiveness under many conditions, including in states where there is either little or a great deal of variance in the parties' performances across districts (Burden and Smidt 2020; Stephanopoulos and McGhee 2018).

The mean-median difference test is also particularly sensitive. In a study comparing different methods, Jonathan Krasno et al's (2019) analysis of the Wisconsin Assembly map drawn in 2011 using results from 13 statewide elections in the two cycles immediately preceding and following the redistricting revealed the mean-median difference was the method by far the most likely to indicate "substantial" partisan gerrymanders.

A third test, "lopsided margins", simply compares the mean margins of victory in all districts for each of the parties. The party with the larger margins of victory is most likely to have its voters concentrated and therefore subjected to a gerrymander. Analysts can then use a t-test to see if the difference in the means for the parties is statistically significant (Wang 2016). This helps us get a grasp of competitiveness, but not always proportionality.

v. Summary

The value placed on proportionately and competitiveness by analysts of district plans, including the plaintiffs in *Harper* and *NCLCV*, highlight an important problem with judicial efforts to address partisan gerrymandering. Partisan gerrymandering is an abstract and complex concept that defies clear standards suitable for decisive intellectual analysis by political scientists. The reality of a first-past-the-post electoral system with single-member districts make it prohibitively difficult to discover districts that maximize both proportionality and competitiveness using available statistical techniques. Map-drawers, who are generally not political scientists, therefore often find it difficult to know which tools to use when evaluating competing plans. They discover their attempts to promote one desired principle like proportionality often undermine their efforts to promote another like competitiveness. My understanding of the social science of identifying partisan gerrymanders does not make me question it as derisively as Chief Justice John Roberts when he described the efficiency-gap measure as “gobbledygook” in oral arguments during *Whitford*. However, I believe even if judges think they have the power to reject maps drawn by the states on the basis that they constitute a partisan gerrymander, the objectives of litigants are often too broad and conflicted and the tools we have to analyze district plans too numerous, complex, and problematic to provide necessary clear and satisfactory direction.

VI. Additional Conceptual and Analytical Considerations

i. Method

In this section, I assess "baselines" that permit meaningful evaluation of district plans. To do this, I use my knowledge of North Carolina political history and survey the political science literature on methods.

ii. The Clustered General Population

The difficulty of generating transparent and objective standards for what constitutes a partisan gerrymander in the opinion of political scientists is relevant to this section as well. Here, I explicitly address the issue of what "baselines" to use or, in other words, what assumptions we should take into the exercise of constructing and evaluating district plans.

The first task is to account for the real world. Whether the issue involves general redistricting criteria like compactness, contiguity, and the maintenance of communities of interest, VTDs, or municipalities, or generally understood characteristics of partisan gerrymanders such as disproportionality or a lack of competitiveness, it is fair to ask not how any potential plan compares to an absolute standard but the "state of nature" or what we might call the "natural gerrymander". North Carolinians are spread unevenly within an oddly-shaped state. Some counties, communities, and VTDs are relatively small, others are quite large. Some are densely populated, others sparsely populated. So, for example, when we talk about a plan's performance with regards compactness, it is important to note the extent to which dividing the state into 14, 50, or 120 evenly populated chunks mitigates against the principle. Many observers use the Polsby-Popper measure of compactness which reports results on a scale of 0 to 1. The congressional, state House, and state Senate plans enacted by the state legislature have Polsby-Popper mean scores of .30, .35, and .34 respectively. Is this unreasonably different from the state of nature? It is impossible to know, but from a basic examination of the three maps by someone with an understanding of the location of North Carolina's urban and rural areas they look, with a few plausible exceptions, quite compact.[36]

iii. The Partisan Clustering of the Voting-Age Population

What is more, Democratic and Republican voters are clustered. Democrats tend to live with other Democrats and Republicans with other Republicans. Democrats dominate the cities, Republicans small towns and rural areas of the state. Political scientists have various theories about why this is so. It could be the product of people with similar demographic characteristics like income, education, or race living together or people being persuaded to agree with their neighbors or moving to a place with more agreeable neighbors (Levendusky 2009; Rodden 2019). Regardless, the phenomenon poses significant challenges to legislators.

Published research demonstrates the problem. In a recent analysis of North Carolina, Gimpel and Harbridge-Yong (2020) reveal conceivable racial, occupational, geophysical, and sociocultural communities of interest tend to be homogenous in their partisan affiliations. To maintain many of them you must "pack" Democratic or Republican voters.

[36] There is another different but simpler measure of the compactness called the Reock test which essentially looks to see what proportion of the area of a circle drawn around its perimeter a district occupies.

iv. The Use of Election Data to Identify Democratic and Republican Voters

The second question regarding the establishment of baseline assumptions required to evaluate a district plan is the identification of Democratic and Republican voters. Analysts have sensibly moved away from using party registration data because of the large number of unaffiliated voters and the reality that the act of registering to vote is very different from that of casting one. So, although the criteria adopted by the North Carolina House and Senate redistricting committees in 2021 explicitly prevented legislators from using "election data", we, as observers, have the luxury of election results. But which ones should we use? Many, including the plaintiffs in these two cases, utilize recent statewide contests as their benchmark. They take the precinct-level returns from these elections and superimpose the enacted plans on them to determine hypothetically how many seats each party would receive.

Statewide elections for different offices or held at different times, even if observations are only two or four years apart, can produce significantly different outcomes. Votes are not fixed. The candidates, campaigns, office sought after, and contemporaneous political conditions mean voters do not consistently reveal themselves as Democrats or Republicans since many split their votes between the parties. In 2020, for example, Gov. Roy Cooper, a Democrat, beat Republican Lt. Gov. Dan Forest by 4.5 percentage points. In the presidential race that year, President Donald Trump the Republican defeated his Democratic opponent, former Vice President Joe Biden, by 1.3 percentage points. There was significant talk of "Cooper-Trump" voters, one North Carolina political scientist estimated roughly eight to twelve percent said they would vote this way shortly before the election.[37] Turnout can also vary considerably and many voters participate in only one or a few of the elections used for analysis. When measured as a proportion of registered voters, turnout increased six percentage points over 2016 in the 2020 North Carolina election for president. Turnout also varies geographically. Eighty percent of registered voters in Wake County cast a ballot in 2020, only 62 percent of their counterparts in Robeson County did.

Research on Ohio and Wisconsin, two states at the epicenter of redistricting battles, demonstrates the problem of what election(s) to use. The Krasno et al (2019) paper cited earlier revealed that, in addition to the choice of diagnostic method, the choice of election had a material effect on whether an analyst could reasonably describe the 2010 Wisconsin state district plan as a gerrymander or not. Redistricting experts Micah Altman and Michael McDonald examined the competiveness of various Ohio congressional district plans drawn after the 2010 census. "District competitiveness", a component of a formula reformers used to judge the maps somewhat arbitrarily set at 55-45 or less, provided diverse outcomes depending on the baseline election data used (Altman and McDonald 2017).

This problem also afflicts a recent approach to the analysis of district plans I did not consider in the previous section. Armed with sophisticated software, researchers can now use computer algorithms to generate large numbers of alternative maps by combining VTDs that are contiguous and equal in population. This method can produce thousands of maps that, although generally ignoring criteria such as compactness and the maintenance of other

[37] This was Christopher Cooper of Western Carolina University (McElroy 2020).

jurisdictions like counties and communities of interest, are drawn without knowledge of partisan voting patterns. Any particular map is said to demonstrate an intolerable partisan gerrymander if it produces returns that are distant from those of the mean or median of all the computer-generated maps (Chen and Rodden 2015).[38]

Finally, the problem of baseline election results also afflicts *post facto* analyses of district plans. Goedert (2017) has shown that plans considered partisan gerrymanders often produce more competitive elections than those considered "bipartisan". This is the result of the so-called "dummymander", where the majority party in the state legislature enacts plans in which its voters are distributed so thinly across districts that although it might enjoy considerable advantages in theory and the short-term, the minority benefits in the longer term, especially in the aftermath of "wave" elections. Grofman and Brunell (2005) argue this is what happened to the 1990 Democratic "gerrymander" of North Carolina congressional districts. From the perspective of later in the decade, therefore, a plan that originally seemed biased in favor of the state legislative majority party can appear biased toward the opposition. It is not, therefore, what is usually called a partisan gerrymander.

This concern with the choice of baseline elections motivated Stephanopoulos and McGhee's efficiency gap. They claim a principal strength of their method is that it does not use exogenous election results but the outcomes of the actual legislative contests fought using the plan in question. This is not without problems, however. It is difficult to know

[38] This was the method by which the North Carolina Senate drew state legislative maps following the order from the Court in *Common Cause*. It took five simulated maps and selected between them by lottery.

what to do with uncontested races when calculating statewide party vote totals. Moreover, because candidates win their seats with a plurality of the vote, they have no incentive to maximize. This undermines our capacity to understand the true statewide Democratic and Republican votes under a plan.

v. The Concept of "Community"

One last point regarding analytical challenges. The plaintiffs in *NCLCV* refer repeatedly to the belief that legislators' district plans should have maintained "communities" of Democratic voters and, especially, Black citizens. What precisely constitutes a "community of interest" for the purposes of redistricting has long been disputed. The term is unavoidably vague. Communities are ill-defined and surely many of them overlap or are nested within others. It is therefore impossible to understand whether the plaintiffs' optimized maps are really an improvement in the number of communities maintained, regardless of the central feature of such communities.

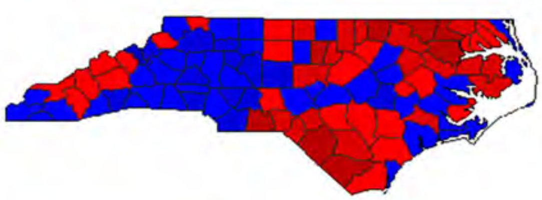
VII. A Recent History of North Carolina Party Politics

i. Method

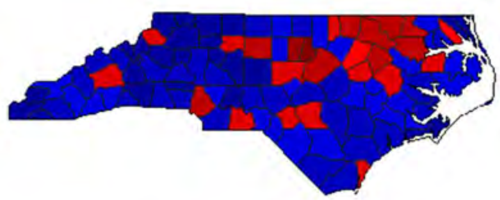
In this final section, I deploy my knowledge of and survey the academic literature on party politics, particularly in North Carolina.

ii. The Changing Geographic Character of North Carolina Democratic and Republican Voters

The two figures below show county returns for the competitive 1992 (left) and 2020 (right) presidential elections in North Carolina. The data are taken from uselectionatlas.org, a highly reputable source of presidential election data. The counties won by the Democratic candidates (Bill Clinton and Joe Biden) are marked in red (unfortunately the site prefers to give the parties the colors opposite to those assigned to them in today's popular culture) and those won by the Republicans (George H.W. Bush and Donald Trump) in blue. Deeper shading denotes a larger margin of victory. Bush beat Clinton in North Carolina in 1992 by 0.8 percentage points (Ross Perot won 13.7 percent of the vote) and Trump beat Biden in 2020 by 1.3 percentage points.



Clinton (red) v. Bush (blue), 1992



Biden (red) v. Trump (blue), 2020

Note the significant differences. Some areas, such as the counties in northeastern North Carolina and the foothills surrounding Charlotte voted for the same party in both elections, but most of southeast North Carolina became Republican. This is also true of a lot of rural counties in the center and far western part of the state. At the same time, urban areas became more Democratic. In 1992, Bush won Forsyth and Mecklenburg counties and narrowly lost Wake. Trump was defeated in all three in 2020, in Mecklenburg and Wake by around 30 percentage points.

The contrasting figures demonstrate a significant change in North Carolina's political geography. Democrats used to do well in rural areas, especially in the eastern part of the state. Republicans were competitive in urban and suburban areas. That is no longer true. The transformation is not the result of redistricting. Neither, clearly, were the significant gains Republicans made in congressional and state legislative seats in North Carolina in the 1990s and first decade of this century.

How does this happen? Much of it is a function of slow social and economic forces that only reveal themselves over several decades or redistricting cycles. Most individuals vote for candidates of the party with which they identify—according to 2020 exit polls around 95 percent of self-proclaimed Democrats and Republicans in North Carolina voted for the presidential candidate of the party they linked themselves to. But it can also be explained by choices that parties and their leaders, candidates, and activists make. North Carolina's population is changing rapidly with large numbers of newcomers entering the state annually, the state grew by about nine percent or 850,000 people between 2010 and 2018. They are ripe for socialization into its politics. Today, North Carolina has about 2.3 million unaffiliated voters (roughly a third of the total) whose allegiances are up for grabs.

The Shor-McCarty (Shor and McCarty 2011) measures of state legislative party ideology cited earlier, moreover, reveal that between 2008 and 2018 the median North Carolina House Democrat moved .215 points to the left and the median Senate Democrat .008 points to the left. At the same time research showed North Carolina public opinion to be moving in the opposite direction (Berry et al 1998).[39] Other research suggests Democratic national elites are today to the left of Democratic voters (Furnas and LaPira 2021). Decisions made by the parties' organizational leaders, elected officials, and activists have significantly contributed to these developments.

Candidates are certainly captive to the reputation of the party whose label they must run with on the ballot (Grynaviski 2013). However, it is also true voters are responsive to candidates' positions on particular issues and their skills as campaigners.[40] They also engage in spatial voting or the exercise of choosing the candidate they feel is closer to them ideologically.[41] On balance, this extensive research suggests that parties can greatly influence primary outcomes and by nominating candidates suited to their political surroundings can markedly improve their chances of winning in a district (Hassell 2017). Alternatively, party leaders and motivated activists can leave in place internal rules and procedures and go to the courts to move district lines to benefit their candidates so they may continue to select the same individuals to represent their party in general elections.

VIII. Conclusion

There are two analytical approaches to the investigation of the phenomenon typically called a "partisan gerrymander". Researchers can examine individual districts or the larger

[39] Updated data can be found at: https://rcfording.com/state-ideology-data/
[40] This is a huge literature. A good example is Herrnson and Curry (2011).
[41] This is also a large literature. An influential work is Jessee (2012).

district plan. I have chosen the latter. I have done this for two reasons. First, it is more consistent with my expertise. I am not a mathematician or computer scientist like some of the plaintiffs, but I have spent over two decades observing and writing about American and North Carolina politics and have broad and deep understanding of the complex issues and academic literature on state legislatures, elections, and redistricting. Second, the considerable time constraints placed on me prohibits a detailed district-by-district statistical analysis of the congressional, state Senate, and state House plans.

In the first section of my report, I argue that the process used by the North Carolina General Assembly to create and enact the district plans was consistent with the provisions of the Constitution of North Carolina that speak directly to redistricting. The second section covers my evaluation of the plaintiffs' claims that the plans violate political science's understanding of free elections, equal protection, freedom of speech, and freedom of assembly. Next, I explain the difficulty of identifying plans afflicted with a "partisan gerrymander", the problems with the methods used in these types of studies, and the contradictions between various characteristics—namely proportionality and district-level competitiveness of the parties—many would like to see maps exhibit. In the fourth section, I address additional issues with conceptualization and analysis, particularly those of baseline assumptions. I conclude with a brief look at the state political parties and how they enjoy agency in general elections the critics of district plans imply they do not.

The plaintiffs in *NCLCV* claim to have "harnessed the power of high-performance computers, and employed cutting-edge computational methods and resources, to draw alternative maps".[42] They claim their plans "avoid the partisan gerrymandering and racial vote dilution that mark the Enacted Plans (those approved by the state legislature), while also improving on the Enacted Plans' compliance with the laws and legitimate policies governing redistricting in North Carolina." The plaintiffs state the General Assembly's plans should be rejected because they "cannot withstand the scrutiny of math and science".[43]

I believe as an expert in the field of political science, the plaintiffs in *NCLCV* have much less command of other subjects more central to redistricting. Their approach glosses over the challenges posed by the evaluation of district maps for properties of partisan gerrymandering. There is no clear consensus among political scientists on the meaning of a partisan gerrymander as a political concept. The choice of baselines necessary for this analysis is a contentious exercise. General and voting-age populations live in such ways as to give states features that contribute to what many might call a natural gerrymander. The preferences of individual voters are often undiscernible, but when they do present themselves they can be fluid and vary temporally and across offices. Candidates and political parties are not helpless in structuring voters' behavior. We understand a partisan plan is measured along several dimensions, but we cannot fully agree on the importance to assign to each one and therefore what is the best way to assess a district map. We also know that efforts to maximize along different dimensions can sometimes be complementary and at other times incompatible.

More importantly, I believe based upon my analysis of North Carolina's political history, the state's redistricting tradition compels the enacted plans. The question is not whether the

[42] Verified complaint in *NCLCV v. Hall*, p. 62.
[43] Verified complaint in *NCLCV v. Hall*, p. 4.

plaintiffs' plans are in some way superior. It is whether the enacted plans are lawful. The process the North Carolina General Assembly used was consistent with the framework of redistricting in the state, a bar that is low given the uniquely considerable latitude the state's statutes and constitution give the legislature to consider and approve maps. Political concepts cited by the plaintiffs have little-to-nothing to do with common understandings of the practice of redistricting as it is done in North Carolina or the United States. Those who want different redistricting outcomes should work through the political process to obtain them. The people can elect different legislators or alter other critical features of our politics that make the results of legislative elections so distasteful to them. The people can change the law to provide us with a new method of drawing single-member districts such as the independent non-partisan redistricting committee of House Bill 69 that, in 2019, gathered 66 co-sponsors from both parties. Or, alternatively, the people can enact a thorough overhaul of their electoral system by amending their constitution. For the courts to make such a change is inconsistent with the principle of separation of powers or the manner in which the state's constitution has historically been applied.

IX. References

Altman Micah, and Michael P. McDonald. 2017. "Redistricting by Formula: The Case of Ohio." American Politics Research 46: 103-31.

Arazia, William D. 2015. *Enforcing the Equal Protection Clause: Congressional Power, Judicial Doctrine, and Constitutional Law*. New York: New York University Press.

Berry, William B., Evan J. Ringquist, Richard C. Fording, Russell L. Hanson. 1998. "Measuring Citizen and Government Ideology in the American States, 1960-93." *American Journal of Political Science*, 42: 327-348.

Bitzer, J. Michael. 2021. *Redistricting and Gerrymandering in North Carolina: Battlelines in the Tar Heel State*. London: Palgrave MacMillan.

Burden, Barry and Corwin Smidt. 2020. "Evaluating Legislative Districts Using Measures of Partisan Bias and Simulations". *SAGE Open*, https://journals.sagepub.com/doi/pdf/10.1177/2158244020981054

Chen, Jowei and Jonathan Rodden. 2015. "Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders," *Election Law Journal*, 14: 331-45.

Christensen, Rob. 2008. *The Paradox of Tar Heel Politics: The Personalities, Elections, and Events that Shaped Modern North Carolina*. Chapel Hill: University of North Carolina Press.

Cooper, Christopher A. 2008. "The People's Branch: Reassessing the North Carolina General Assembly," in Christopher A. Cooper and H. Gibbs Knotts, *The New Politics of North Carolina*, Chapel Hill: University of North Carolina Press, pp. 152-74.

Engstrom, Erik J. 2013. *Partisan Gerrymandering and the Construction of American Democracy*. Ann Arbor: University of Michigan Press.

Evans, Eric J. 1994. *The Great Reform Act of 1832*. New York: Routledge.

Fleer, Jack. D. 1994. *North Carolina Government and Politics*. Lincoln: University of Nebraska Press.

Furnas, Alexander C., and Timothy M. LaPira, "Political Elites Are More Supportive of Progressive Policies Than the Average Voter", report for Data Progress, at: https://www.dataforprogress.org/blog/2021/12/9/political-elites-are-more-supportive-of-progressive-policies-than-the-average-voter

Gimpel, James G. and Laurel Harbridge-Yong. 2020. "Conflicting Goals of Redistricting: Do Districts That Maximize Competition Reckon with Communities of Interest?" *Election Law Journal: Rules, Politics, and Policy* 19: 451-71.

Gimpel, James G., Tristan M. Hightower, and Patrick C. Wohlfarth. 2021. "The Geography of Law: Understanding the Origin of State and Federal Redistricting Cases," *Political Research Quarterly*, 74: 779-94.

Goedert, Nicholas. 2017. "The Pseudoparadox of Partisan Mapmaking and Congressional Competition", *State Politics and Policy* 17: 47-75.

Grofman, Bernard and Thomas L. Brunell. 2005. "The Art of the Dummymander: The Impact of Recent Redistrictings on the Partisan Make-Up of Southern House Seats," in Peter F. Galderisi, ed., *Redistricting in the New Millennium*, Lanham, MD: Rowman, Littlefield, pp. 183-99.

Grynaviski, Jeffrey D. 2013. *Partisan Bonds: Political Reputations and Legislative Accountability*, New York: Cambridge University Press.

Hassell, Hans J.G. 2017. *The Party's Primary: Control of Congressional Nominations*. New York: Cambridge University Press.

Herrnson, Paul S. and James M. Curry. 2011. "Issue Voting and Partisan Defections in Congressional Elections," *Legislative Studies Quarterly* 36: 281-307.

Jessee, Stephen A. 2012. *Ideology and Spatial Voting in American Elections*, New York: Cambridge University Press.

Krasno, Jonathan, Daniel B. Magelby, Michael D. McDonald, Shawn Donahue, Robin E. Best. 2019. "Can Gerrymanders Be Detected? An Examination of Wisconsin's State Assembly," *American Politics Research*, 47: 1162-1201.

Kruman, Marc W. 1983. *Parties and Politics in North Carolina, 1836-65*. Baton Rouge: Louisiana State University Press.

Levitsky, Steven and Daniel Ziblatt. 2018. *How Democracies Die*, New York: Crown.

Levendusky, Matthew. 2009. *The Partisan Sort: How Liberals Became Democrats and Conservatives Became Republicans*, Chicago: University of Chicago Press.

Masket, Seth and Boris Shor. 2015. “Polarization without Parties: Term Limits and Legislative Partisanship in Nebraska’s Unicameral Legislature.” *State Politics and Policy*, 15: 67-90.

McCarty, Nolan, Keith T. Poole, and Howard Rosenthal. 2009. “Does Gerrymandering Cause Polarization?” *American Journal of Political Science*, 53: 666-80.

McDonald, Michael D. and Robin E. Best. 2015. “Unfair Partisan Gerrymanders in Politics and Law: A Diagnostic Applied to Six Cases,” *Election Law Journal*, 14: 312-30.

McElroy, Michael. 2020. “Somebody Voted for Roy Cooper and Donald Trump. Who Are These Voters?” *Cardinal and Pine*, November 30, https://cardinalpine.com/story/somebody-voted-for-roy-cooper-and-donald-trump-who-are-these-voters/

McLean, Iain and Alistair McMillan, eds., 2003. *Oxford Concise Dictionary of Politics*, 3rd. ed., New York: Oxford University Press.

New York Times. 1995. “Last Governor Without Veto Could Get It.”. February 12, https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:3S89-W820-008G-F1CJ-00000-00&context=1516831.

Orth, John V. 1992. “North Carolina Constitutional History”. *North Carolina Law Review*, 70: 1759-82, 1797-8.

Rodden, Jonathan A. 2015. *Why Cities Lose: The Deep Roots of the Urba-Rural Political Divide*. New York: Basic Books.

Shor, Boris and Nolan McCarty. 2011. “The Ideological Mapping of American Legislatures.” *American Political Science Review*, 105: 530-51.

Stephanopoulos, Nicholas and Eric McGhee. 2018. “The Measure of a Metric: The Debate Over Quantifying Partisan Gerrymandering,” *Stanford Law Review*, 70:1503-68.

Wang, Samuel S-H. 2016. “Three Practical Tests for Gerrymandering: Application to Maryland and Wisconsin,” *Election Law Journal*, 15: 367-84.

APPENDIX A

December 2021

ANDREW JOHN TAYLOR

Professor
North Carolina State University
Department of Political Science
School of Public and International Affairs
Box 8102
Raleigh, NC 27695-8102
Web: https://sites.google.com/ncsu.edu/taylor/

Phone: (919) 515-8618
Fax: (919) 515-7333
E-mail: ataylor@ncsu.edu

Professional Experience

Professor of Political Science, North Carolina State University, 2007-Present
Chair, Department of Political Science, North Carolina State University, 2006-10
Associate Professor of Political Science, North Carolina State University, 2001-7
Assistant Professor of Political Science, North Carolina State University, 1995-2001
Adjunct Instructor of Political Science, University of Connecticut at Hartford, 1991-5

Education

Ph.D. Political Science, University of Connecticut, 1995.
M.A. Government, Lehigh University, Bethlehem, Pennsylvania, 1990.
B.A. American Studies (Politics and Government), University of Kent at Canterbury, United Kingdom, 1988.

Publications
Books:

The End of Consensus: Diversity, Neighborhoods, and the Politics of Public School Assignments (Chapel Hill: University of North Carolina Press, 2015) with Toby L. Parcel
(Reviewed in *Teachers' College Record*, *Contemporary Sociology*, *Southern Spaces*, *Social Forces*)

Congress: A Performance Appraisal (Boulder, CO: Westview Press, 2013)
(Subject of New Books in Political Science podcast, Huffington Post piece; reviewed in *Political Science Quarterly*)

The Floor in Congressional Life (Ann Arbor: University of Michigan Press, 2012)
(Reviewed in *Party Politics*, *Political Science Quarterly*, *Congress and the Presidency*, *Perspectives on Politics*)

Elephant's Edge: The Republicans as a Ruling Party (Westport, CT: Praeger, 2005)
(Reviewed in *New York Times*, *Political Science Quarterly*, *Perspectives on Politics*; starred review in *Library Journal*, highly recommended by *Choice*; discussed in articles in *Los Angeles Times*, *New York Daily News*)

Publications (cont.):
Articles in Refereed Academic Journals:

"The Individual-Level Origins of Congressional Corruption Scandals," *American Politics Research*, 48 (July 2020): 442-54. (with Michael D. Cobb).

"Partisan Affiliation in Political Science: Insights from Florida and North Carolina," *PS: Political Science and Politics*, 52 (October 2019): 706-10 (with Lonna Rae Atkeson).

"Legislative Seniority in the Partisan Congress," *Social Science Quarterly*, 100 (June 2019): 1297-1307.

"The Revolution in Federal Procurement, 1980-Present," *Business and Politics*, 21 (March 2019): 27-52.

"Proximity and the Principle-Policy Gap in White Racial Attitudes: Insight from Views of Student Assignment Policies in Wake County, North Carolina," *Social Science Research*, 79 (February 2019): 95-103 (with Toby L. Parcel).

"Which U.S. House Members Present Their Legislative Records? Models of Electoral Accountability and the Content of Press Releases," *Congress and the Presidency*, 44 (1, 2017): 102-19.

"An Absence of Malice: The Limited Utility of Campaigning Against Party Corruption," *American Politics Research*, 43 (November 2015): 923-51 (with Michael D. Cobb).

"Bill Passage Speed in the U.S. House: A Test of a Vote-Buying Model of the Legislative Process," *Journal of Legislative Studies*, 3 (September 2014): 285-304.

"Paging Congressional Democrats: It Was the Immorality Stupid," *PS: Political Science and Politics*, 47 (April 2014): 351-6 (with Michael D. Cobb).

"When Congress Asserts Itself: Examining Legislative Challenges to Executive Power," *The Forum*, 10:2 (Article 2), July 2012.

"Does Presidential Primary and Caucus Order Affect Policy? Evidence from Federal Procurement Spending," *Political Research Quarterly*, 63 (June 2010): 398-409.

"Strategic Inter-cameral Behavior and the Sequence of Congressional Lawmaking," *American Politics Research*, 36 (May 2008): 451-74.

"The Presidential Pork Barrel and the Conditioning Effect of Term," *Presidential Studies Quarterly*, 38 (March 2008): 97-110.

"Size, Power, and Electoral Systems: Exogenous Determinants of Legislative Procedural Choice," *Legislative Studies Quarterly*, 31 (August 2006): 323-45.

Publications (cont.):
Articles in Refereed Academic Journals (cont.):

"The Personal and Political in Repeat Congressional Candidacies," *Political Research Quarterly*, 58 (December 2005): 599-607. (with Robert G. Boatright).

"Conditional Party Government and Campaign Contributions: Insights from the Tobacco and Alcoholic Beverage Industries," *American Journal of Political Science*, 47 (April 2003): 293-304.

"Are Women Legislators Less Effective? Evidence from the U.S. House in the 103rd-105th Congresses," *Political Research Quarterly*, 56 (March 2003): 19-27. (with Alana Jeydel).

"The Ideological Roots of Deficit Reduction Policy," *Review of Policy Research*, 19 (Winter 2002): 11-29.

"A New Democrat? The Economic Performance of the Clinton Presidency," *The Independent Review*, 5 (Winter 2001): 387-408. (with John W. Burns).

"Congress as Principal: Exploring Bicameral Differences in Agent Oversight," *Congress and the Presidency*, 28 (Fall 2001): 141-59.

"The Mythical Causes of the Republican Supply-Side Economics Revolution," *Party Politics*, 6 (October 2000): 419-40. (with John W. Burns).

"The Congressional Budget Process in an Era of Surpluses," *PS: Political Science and Politics*, 33 (September 2000): 575-80. (Reprinted in, Michael LeMay, *Public Administration: Clashing Values in the Administration of Public Policy*, (Belmont, CA: Wadsworth/Thomson Learning, 2005)).

"Explaining Government Productivity," *American Politics Quarterly*, 26 (October 1998): 439-58.

"Domestic Agenda Setting, 1947-1994," *Legislative Studies Quarterly*, 23 (August 1998): 373-97.

"The Legislative Strategies of Independent and Third Party Executives," *Southeastern Political Review*, 26 (March 1998): 3-23.

"The Ideological Development of the Parties in Washington, 1947-1994," *Polity*, 19 (Winter 1996): 273-92.

"The Ideological Development of the Modern Republican President," *Presidential Studies Quarterly*, 26 (Spring 1996): 374-9.

"Historical Analogies in the Congressional Foreign Policy Process," *Journal of Politics*, 57 (May 1995): 460-8. (with John T. Rourke).

Publications (cont.):
Chapters in Edited Volumes:

"Legislative Speech in Presidential Systems," in Hanna Back, Marc Debus, and Jorge M. Fernandes (eds.) *The Politics of Legislative Debate*, (New York: Oxford University Press, 2021), pp. 51-71.

"Leading the Minority: Guiding Policy Change through Legislative Waters," in Sean Q. Kelly and Frank H. Mackaman (eds.) *Robert H. Michel: Leading the Republican House Minority*, (Lawrence: University Press of Kansas, 2019), pp. 115-139.

"A Study in Contrasts: Race, Politics, and the History of School Assignment Policies in Charlotte-Mecklenburg and Wake County, North Carolina," in Roslyn Arlin Mickelson, Stephen Samuel Smith, and Amy Hawn Nelson (eds.) *Yesterday, Today, and Tomorrow. School Desegregation and Resegregation in Charlotte*, (Harvard Education Press, 2015), pp. 85-100. (with Toby L. Parcel and Joshua A. Hendrix).

"Voting on the Floor: Members' Most Fundamental Right," in Jamie Carson (ed.), *New Directions in Congressional Politics*, (New York: Routledge, 2011), pp. 143-62.

Other Academic Publications:

"The 2020 Elections in North Carolina", *Political Economy in the Carolinas*, forthcoming.

"The Expert in American Life", *National Affairs*, (Fall 2021, No. 49), 141-55.

"Reforming the Appropriations Process", *National Affairs* (Spring 2019, No. 39), 33-49.

"How Far Is Too Far? Gender, Emotional Capital and Children's Public School Assignments", *Socius*, 2 (2016) (with Toby L. Parcel and Joshua A. Hendrix).

"The Challenge of Diverse Public Schools," *Contexts*, 15 (Winter 2016): 42-47 (with Toby L. Parcel and Joshua A. Hendrix).

"Power Divisions in Governments," in Frank N. Magill (ed.), *Survey of Social Science: Government and Politics Series* (Pasadena CA: Salem Press, 1995), 1578-83.

"Teaching Politics Panoramically: American Government and the Case Method," *PS: Political Science and Politics*, 27 (September 1994): 535-7.

"A Proper British Revolution? How the Public Views Constitutional Reform," *The Public Perspective*, July/August 1994, 31-4. (with W. Wayne Shannon).

Conference Papers

American Political Science Association, 2021, 2018, 2017, 2015, 2014, 2013, 2010, 2006, 2005, 2004, 2003, 2002, 2001, 1999, 1998, 1997, 1996, 1994.

Midwest Political Science Association, 2021, 2018, 2017, 2015, 2013, 2012, 2011, 2010, 2008, 2007, 2006, 2005, 2003, 2002, 2001, 1996, 1994, 1992.

Southern Political Science Association, 2021, 2020, 2019, 2017, 2016, 2001, 1998, 1997.

Western Political Science Association, 2019.

Citadel Symposium on Southern Politics, 2020.

Northeastern Political Science Association, 1992, 1991.

New England Political Science Association, 1992.

North Carolina Political Science Association, 2003, 1999, 1996.

World Association for Public Opinion Research, 1994.

Selected Major Grants and Other Revenue Generated (Extramural and NCSU Intramural)

John William Pope Foundation and Charles G. Koch Charitable Foundation for, "The Free and Open Societies Project" - $327,250 total: 2022, ($73,000), 2021 ($98,750), 2020 ($155,500).

U.S. Embassy, London, "Build Your Own Campaign" program for British high school students, 2016 - $56,138.

John William Pope Foundation for, "The Economic, Legal, and Political Foundations of Free Societies" (with Steve Margolis) - $1.638 million total: 2014, ($426,000 overall, $268,000 for teaching and research in political science); 2009 ($700,000 overall, $274,200 for political science), 2004 ($511,500 overall, $214,000 for political science).

Fidelity Investments, support for NCPSA meeting, 2014 - $5,000 (in kind).

Dail Endowment in Political Science, 2013 - $145,800.

NCSU School of Public and International Affairs Summer Grant - $10,000 total: 2013 ($5,000), 2012 ($5,000).

Charles G. Koch Charitable Foundation, "Programs in the Classical Liberal Tradition," and other projects (with Steve Margolis before 2017) - $219,500 total: 2018 ($63,000); 2017 ($74,200); 2015 ($23,300); 2014 ($19,000); 2013 ($18,000), 2012 ($9,000), 2011 ($9,000), 2010 ($4,000).

NCSU Distance Education and Learning Technology Applications IDEA Grant, $10,500 total 2009 ($8,000), 2003 ($2,500).

U.S. Department of State for, "U.S. Elections Program for Brazilian Fulbrighters" (with Michael Bustle, David McNeill, and Richard Kearney), 2008 - $75,000.

Dirksen Congressional Center Congressional Research Award - $3,663 total: 2003 ($3,163), 1994 ($500).

NCSU University and College of Humanities and Social Sciences (CHASS) Summer Grants - $17,000 total: 2003 ($5,000), 1999 ($4,000), 1997 ($4,000), 1996 ($4,000).

Invited Academic Talks

University of North Carolina at Chapel Hill, 3/03.
East Carolina University, 10/04.
University of North Carolina at Greensboro, 9/09.
University of Surrey (UK), 5/11.
NC State College of Education, 2/13, 3/15.
Shanghai Jiao Tong University (China), 4/16.
Wake Forest University, 10/16.
National Affairs (Capitol Hill, Washington DC), 6/19.

Principal Administrative and Leadership Appointments

Director, Free and Open Societies Project, 2019-Present

- Approx. $100k annual budget
- Speaker series, student group, student seminars, free speech conference, research assistants, undergrad research grants, internship support, social media presence

Co-Director, The Economic, Legal and Political Foundations of Free Societies program, 2004-2018; Director 2018-2019

- Approx. $85k annual budget
- Speaker series, student group, student seminars, faculty and grad students research support, undergrad research grants, internship support

Chair, Department of Political Science, 2006-10.

- Instrumental in establishment of School of Public and International Affairs
- Managed $2 million budget
- Approx. 600 majors
- Quadrupled the number of women in tenure-track positions
- Demonstrable improvement in majors' experiences according to exit surveys
- Established formal and transparent rules on program assessment, faculty annual evaluation processes, teaching loads, promotion and tenure guidelines, adjunct and summer school pay

Director, M.A. Program in Political Science, 1997-99; 2000-5

Professional Honors

NCSU CHASS's Outstanding Research Award, 2013-14.
Nominated for NCSU Alumni Association Outstanding Research Award, 2013-14.
President of North Carolina Political Science Association, 2012-13.
John W. Pope Center for Higher Education Policy's "Spirit of Free Inquiry" Award (for course, Public Choice and Political Institutions), 2010.
NCSU Libraries "Fantastic Faculty" honoree, 2008-9.
NCSU Outstanding Extension Service Award, 1999-2000, 2003-4.
NCSU CHASS's Lonnie and Carol Poole Award for Excellence in Teaching, 1998-9.
Nominated for NCSU CHASS's Outstanding Junior Faculty Award, 1997-8, 1998-9.
Oral Parks Award for best Faculty Paper presented at the 1996 North Carolina Political Science Association meeting, 1997.
Phi Kappa Phi 1995.
Phi Beta Kappa 1995.
University of Connecticut Excellence in Teaching Award, 1993.

Teaching and Mentoring

North Carolina State University, Fall 1995-Present.
Courses taught:

- Introduction to American Government (Undergraduate, honors, distance ed., UNC Global Blended Learning Program in China)
- The Presidency and Congress (Undergraduate, distance ed.)
- American Parties and Interest Groups (Undergraduate)
- Public Policy Process (Doctoral program)
- Seminar in American Politics (Undergraduate and graduate)
- Legislative Process (Undergraduate)
- Workshop in Politics (Undergraduate)
- Public Choice and Political Institutions (Undergraduate)
- The Classical Liberal Tradition (Undergraduate and honors)
- The Conservative Tradition in the West (Undergraduate and honors)
- Election 2020 (Honors)

- Ph.D. dissertation committees (Public Administration & Economics at NCSU, Political Science at UNC): 9 (including one chair)
- Master's theses supervised: 5
- Undergraduate honors thesis supervised: 12 (including runner-up Pi Sigma Alpha national competition for best Honor's thesis)
- Park Scholars Mentor: 2010-16
- Taught distance education courses since 1997-8, pioneer in the development of such courses at NC State

University of Connecticut, Spring 1991-Spring 1995
Courses taught (in addition to those taught at N.C. State):

- Constitutional Interpretation
- Introduction to Comparative Politics

Fellowships

American Political Science Association Congressional Fellow (Steiger Fellow), 1999-2000:

- Steiger fellow, named for Rep. Bill Steiger (R-WI), who served 1966-78
- given to fellow best equipped to promote the interests of Congress as an institution and who best represents Steiger's values; a man of "exceptional talent, drive, and integrity"

University of Connecticut Pre-Doctoral Fellowships, 1990-1, 1991-2, 1992-3 ($6,000 each).

Select University and Professional Service

Heterodox Academy Political Science Community Co-Leader, 2021-Present
School of Public and International Affairs, Executive Committee, 2021-Present
Campus Conversations Project, 2021-Present
Chair, Presidential Politics Division, Southern Political Science Association, 2022, 2001
Secretary, Classical Liberals of the Carolinas, 2019-Present
Apex High School Academy of Information Technology, Board Member, 2018-Present
Institute for Humane Studies (IHS), Graduate Student & Early Career Mentoring, 2017-Present.
NCSU Faculty Advisor, Leaders for Political Dialogue, 2017-Present.
Senior Editor, *Political Economy of the Carolinas*, 2017-Present.
NCSU School of Public and International Affairs Task Force Chair, Methods 2015-16; F&A Distribution, 2015-16.
NCSU Honors Advisory Board & Admissions Committee, 2014-2018.
Treasurer, North Carolina Political Science Association, 2014-Present.
Program Chair, North Carolina Political Science Association Meeting, 2014.
Co-Chair NCSU CHASS Dean's "Heart of the Matter" Initiative, 2013-15.
NCSU Reappointment, Promotion, and Tenure Committee, 2012-14.
Chair NCSU CHASS Reappointment, Promotion, and Tenure Committee, 2011-12.
NCSU CHASS Associate Director of Development Search Committee, 2011.
American Political Science Association's Albert Dissertation Prize Committee, 2009-10.
The Foundation for Ethics in Public Service, Advisory Board, 2009-12.
NCSU CHASS Committee on Extension, Engagement, and Economic Development, 2008-12.
Coordinator, RTI-NCSU CHASS initiative, 2006-12.
American Political Science Association's Legislative Studies Section Fenno Book Prize Committee, 2015-16, 2005-6.
NCSU Department of Political Science and Public Administration/School of Public and International Affairs Dean's Head/Director Search Committee, 1997-8, 2005-6, 2011-12.
NCSU Department of Political Science and Public Administration Scholars, Honors, and Study Abroad Committee, 2004-6.
NCSU CHASS Research Committee, 2004-7.
NCSU Washington Internship Committee, 2004-7.
NCSU CHASS Curriculum Committee, 2002-4.
Faculty adviser, Truman Scholars Program, NCSU, 2001-4.
NCSU Courses and Curricula Committee, 2002-4.
NCSU Department of Political Science and Public Administration "Structural Issues" Committee (recommended the creation of School of Public and International Affairs), 2000-2.
NCSU CHASS Graduate Studies Committee, Chair, 1998-9.
NCSU Department of Political Science and Public Administration Ph.D. Steering Committee, 1998-2001.
Faculty advisor, NCSU College Republicans 1996-9, 2000-Present; North Carolina Student Legislature, 2005-2012; Young Americans for Liberty 2016-18, 2020-Present; College Libertarians 2018-Present; Society for Politics, Economics, and the Law (SPEL), 2019-Present; Young Americans for Freedom, 2020-Present; The FreePack, 2021-Present.
NCSU Department of Political Science and Public Administration/School of Public and International Affairs Faculty Search Committee, 1995-6, 1998-9, 2000-1, 2001-2 (chair), 2007-8 (chair), 2011-12, 2013-14 (chair).

Book Reviews

The Polarizers: Postwar Architects of our Partisan Era, by Sam Rosenfeld, *Party Politics*, 26 (2020): 264-5.

The Coddling of the American Mind: How Good Intentions and Bad Ideas are Setting Up a Generation for Failure, by Greg Lukianoff and Jonathan Haidt, *Political Economy in the Carolinas*, 2 (2019): 118-20.

Politics Over Process: Partisan Conflict and Post-Passage Processes in the U.S. Congress, by Hong Min Park, Steven S. Smith, and Ryan J. Vander Wielen, *Congress and the Presidency*, 46 (2, 2019): 344-45.

Defying the Odds: The 2016 Elections and American Politics, by James W. Ceaser, Andrew E. Busch, and John J. Pitney, Jr., *American Review of Politics*, 36 (2, 2018): 109-10.

The Rise and Fall of the Voting Rights Act, by Charles S. Bullock III, Ronald Keith Gaddie, and Justin J. Wert, *The North Carolina Historical Review*, 84 (January 2017): 120-1.

Legislating in the Dark: Information and Power in the House of Representatives, by James M. Curry, *Congress and the Presidency* 43 (3, 2016): 401-3.

The Senate Syndrome: The Evolution of Procedural Warfare in the Modern U.S. Senate, by Steven S. Smith, *Perspectives on Politics*, 13 (December 2015): 1168-9.

Seeking a New Majority: The Republican Party and American Politics, 1960-1980, edited by Robert Mason and Iwan Morgan, *Party Politics*, 21 (May 2015): 494-5.

The Challenge of Congressional Representation, by Richard F. Fenno, *Perspectives on Politics* 12 (June 2014): 490-1.

The Tea Party: Three Principles, by Elizabeth Price Foley, *American Review of Politics* 34 (Spring and Summer 2013): 151-3.

Painting Dixie Red: Where, When, Why and How the South Became Republican, ed. by Glenn Feldman, *The North Carolina Historical Review*, 79 (October 2012): 457-8.

The Roots of Modern Conservatism: Dewey, Taft, and the Battle for the Soul of the Republican Party, by Michael Bowen, *The North Carolina Historical Review*, 79 (April 2012): 231-2.

On Thinking Institutionally, by Hugh Heclo, *Modern Age*, 52 (Spring 2010): 158-60.

The New Politics of North Carolina, edited by Christopher A. Cooper and H. Gibbs Knotts, *The North Carolina Historical Review*, 76 (January 2009): 108.

The Paradox of Tar Heel Politics: The Personalities, Elections, and Events that Shaped Modern North Carolina, by Rob Christensen, *The North Carolina Historical Review*, 75 (October 2008): 451-2.

The Right Talk: How Conservatives Transformed the Great Society into the Economic Society, by Mark A. Smith, *Perspectives on Politics*, 6 (September 2008): 611-12.

Politics and Religion in the White South, ed. by Glenn Feldman, *The North Carolina Historical Review*, 73 (April 2006): 288-9.

Vicious Cycle: Presidential Decision Making in the American Political Economy, by Constantine J. Spiliotes, *The Independent Review*, 8 (Summer 2003): 135-8.

The Political Party Matrix: The Persistence of Organization, by J.P. Monroe, *American Political Science Review* 96 (June 2002): 430.

Party Decline in America: Policy, Politics, and the Fiscal State, by John J. Coleman, *Congress and the Presidency* 24 (Spring 1997): 97-9.

Cultivating Congress: Constituents, Issues, and Interests in Agricultural Policymaking, by William P. Browne, *Journal of Politics* 58 (November 1996): 1222-4.

Other Professional Activities

Media Commentary:

Hundreds of appearances on television and radio; source for and quoted in hundreds of print stories. Principally: *The News and Observer* (Raleigh, NC), WRAL-5 (Raleigh, NC), WTVD-11 (Raleigh, NC), WPTF-680 (Raleigh, NC), WUNC-TV (RTP, NC), Public Radio WUNC (Chapel Hill, NC), News Channel 14 North Carolina, Curtis Media Group radio stations (particularly *Carolina Newsmakers* and *The Commentators*) Carolina Journal, NC Spin.

Other Appearances: *The Hartford Courant*, *The Washington Times*, WLFL-22 (Raleigh, NC), Australian Broadcasting Corp., BBC Radio Humberside, Knight-Ridder Newspapers, *The Fayetteville Observer-Times*, *Apex Herald,* WTRG 100.7 (Raleigh, NC), *The Citizen-Times* (Asheville, NC), *The Winston-Salem Journal*, Associated Press, *Durham Herald-Sun*, *Laurinburg* (NC) *Exchange*, *Triangle Tribune* (Durham, NC), *McDowell News* (Marion, NC), *Hendersonville* (NC) *Times-News*, *Transylvania Times* (Brevard, NC), *Kiplinger Letter* (Washington, D.C.), *Charlotte Observer*, Fox News Channel (national cable news), *Greensboro* (NC) *News and Record*, Cox Newspapers, WQDR 94.7 (Raleigh, NC), WXIT-1200 (Boone, NC), *Wilmington* (NC) *Star-News*, *Congressional Quarterly*, Reuters, *Christian Science Monitor*, *Boston Globe*, *Rocky Mount* (NC) *Telegram*, National Public Radio ("All Things Considered", "Marketplace", "1A"), NBC-6 (Charlotte, NC), *The Los Angeles Times*, *North Carolina Political Review*, *The New York Times*, *Dallas Morning News*, *Burlington* (NC) *Times-News*, *National Journal's Congress Daily/A.M.*, *The Cook Report*, Open/net (NC state government tv show), *Dagens Nyheter* (Swedish newspaper), *Politics in America*, Elizabeth City (NC) *Daily Advance*, Freedom Newspapers, Greenville (NC) *Daily Reflector* (Reflector.com), *Triangle Business Journal*, *Eastern Wake News*, Vermont Public Radio, *Daily Herald* (Roanoke Rapids, NC), *High Point* (NC) *Enterprise*, *Wall Street Journal*, *Pittsburgh Post-Gazette*, NewsTalk 106 (Dublin, Ireland), *The Sunday Times* (of London), Nippon tv. (Japan), State Government Radio (NC), Fairchild Publications, Scripps-Howard, ABCNews.com, *Washington Post*, Newhouse Newspapers, *Nubian Message*, CNBC-Asia, *Carolina Journal* Radio, *The Pamlico* (NC) *News*, *New York Daily News*, Public Radio WFAE (Charlotte), *Atlanta Journal-Constitution*, Salon.com, *Chattanooga Times Free Press*, WTN 99.7 (Nashville), *US News and World Report*, News Radio 1020 KDKA (Pittsburgh), *Indianapolis Star*, *Virginia Pilot*, Bloomberg News, *National Journal*, WBT 1110 (Charlotte news), *Daily Dispatch* (Henderson, NC), *Time* Magazine, *Correio Brazilienese* (Brazilian newspaper), C-SPAN, News Talk WDBO-580 (Orlando), Public Radio WHYY (Philadelphia), CNNMoney.com, *O Estado de Sao Paulo* (Brazilian newspaper), VoterRadio.com, *Frankfurter Allgemeine Zeitung* (German newspaper), *Charlotte Magazine*, Delaware Talk Radio, *The Guardian* (U.K. paper), *The Weekly Standard*, Waterbury (CT) *Republican-American*, *USA Today*, EFE (Spanish language news agency), BBC Radio 4, *The Scotsman* (Scottish national paper), *Tax News and Analysis*, *Triangle Tribune*, *San Francisco Chronicle*, Agence France Press, Moneynews.com, *Arab Times* (Kuwaiti English newspaper), The *Gulf Times* (Qatari English newspaper), The *Khaleej Times* (English newspaper out of UAE), *The County Compass* (Bayboro, NC), CashWorks Productions (documentary, "Obama in NC"), *Pravda* (Slovakian newspaper), WXII-12 (Winston-Salem), Voice America Talk Radio, *The Independent Weekly*, *Politico*, WRAL-FM 101.5 (Raleigh), *The Daily Beast*, *Lee County (NC) Star-Tribune*, Carolina Journalism Network, *Excelsior* (Mexican newspaper), *Globe and Mail* (Canada), WERC-AM 960 (Birmingham, AL), WRDU 106.1 (Raleigh, NC), *Wilson* (NC) *Times*, *Christian Post*, Investor Place media, *World Magazine*, BBC.com, *Cary News*, *The State* (South Carolina), *Clayton* (NC) *News-Star*, *Governing Magazine*, WRAL.com, *Raleigh Public Record*, *Business Journal* (Charlotte), *Walter Magazine*, *Wake County Times*, *Roll Call*, *Duplin* (NC) *Times*, CNN, *National Review Online*, *Creative Loafing* (Charlotte), WSJS-600 (Greensboro, NC), *East Wake News*, *Charlotte Business Journal*, Jewish Telegraphic Agency, Brookings Institution, msnbc.com,

Other Professional Activities (cont.)
Media Commentary (cont.):
Irish Times, NC SPIN, GreenWire, *International Business Times*, *The Hill*, FoxNews.com, WCHL (Chapel Hill), *Daily Signal*, CNNPolitics.com, FoxNewsLatino.com, *CQ Weekly*, *The American Prospect*, *Talking Points Memo*, Townhall.com, *Rhino Times* (Greensboro, NC), Ozy.com, *Philanthropy Journal*, EnergyWire, *Garner-Cleveland Record*, *Politico Magazine*, Freedom Action Network Radio, Domecast, *Route Fifty*, *Chapel Hill News*, *Raleigh Magazine*, *Slate*, *North State Journal*, *NC Capital Connections*, *Mother Jones*, *Sierra Magazine*, Alhurra, tvnewscheck.com, Market Watch, *The Atlantic*, *Inside Higher Ed*, *Modern Healthcare*, BBC North America, CBC French Language Service, Inside Climate News, WLOS-ABC 13 (Asheville), HBO, *Piedmont Sundial*, *Asheboro Courier-Tribune*, *School Reform News*, *Robesonian*, *Sanford Herald*, NBCNews.com, *Clarin* (Argentine newspaper), NC Policy Watch, Martin Center for Academic Renewal, *Allegheny News*, *Education Week*, WWNC (Asheville, NC), Sinclair Broadcast Group, *The Hill*, Pew-Stateline, Ifobae (Argentinian news website), WGHP Fox 8 (Greensboro, NC), E&E News, States Newsroom.com, *New Statesman* (UK), CNBC.com, YLE (Finnish tv), France 24, Americans for Limited Government, WNCT (Greenville, NC).
Major Contributions:

- Called "the leading talking head of Tar Heel politics," *News and Observer*, 11/05.
- Stories on which I have provided extensive analysis: presidential, congressional, gubernatorial, and local elections; presidential impeachments; UK politics including elections and Brexit; North Carolina politics; policy issues including education, government spending, taxes, health care, agriculture etc.
- Newspaper op-ed topics (mainly for *News and Observer* and prior to 2010) include: establishment of Connecticut income tax, Republican party politics, the flat tax, third party politics, North Carolina tobacco politics, reform of North Carolina legislature, John Edwards as possible Gore vice president, effect of 2000 election on voting procedures, ability of George W. Bush to govern, proposals for political reform in North Carolina, U.S. and war on terrorism, 2002 North Carolina U.S. Senate race, John Edwards 2004 presidential campaign, reform of NC House, 2006 election, 2008 North Carolina presidential primary, earmarks in Congress, land-use law in North Carolina.
- Column in *Carolina Journal* 2009-13, 2015-21 (monthly), 2021-present (periodic) (40,000 print subscribers, 40,000 unique monthly visitors to website, picked up by newspapers all over North Carolina with est. 300,000 circulation), topics include: NC and the stimulus, financing of elections, legislative term limits, merit pay for teachers, institutional thinking, tobacco industry, political leadership in NC, health care reform, American and French economic models, the role of a public university, 2010 elections, Newt Gingrich, the filibuster, 2010 NC Senate race, Wake County school board politics, 2012 primaries, "bailout fatigue", Obama performance, donors to conservative causes, education reform, NC congressional delegation, 112th Congress, conservatism today, conservatives and foreign policy, municipal government, election administration, Anglo-American relationship, performance of NC General Assembly, Washington debt deal, income and voting, 2012 presidential race, ethics in politics, Romney presidential candidacy, NC same-sex marriage amendment, juridical democracy, runoff elections, Romney's choice of Ryan, errors in conservatives' thinking, 2012 election postmortem, gender differences in politics, UNC system, the Tea Party, unemployment in NC, Margaret Thatcher, Republican governance in NC, polarization in NC, voter identification, classical republicanism,

Other Professional Activities (cont.)
Media Commentary (cont.):
Major contributions (cont.)

- higher education funding, William F. Buckley Jr., party competition, diversity on campus, growth and equality, Trump candidacy, ideology in 2016, Brexit referendum, Republican strategy in 2016, China's challenge, conservative values, science politics, Democrats' "electoral lock", Obama and race, Trump election win, McCrory election loss, advocacy and force in politics, fake news, border-adjustment tax, public's sour mood, Millennials and politics, technocracy, 2018 midterm forecast, state Republicans' economic performance, the party system, political language, viewpoint diversity, Trump and Britain, partisan gerrymander, NRA in politics, Facebook, citizenship and census, NC teacher rally, counties in NC politics, 2018 referendums, Steyer and Trump, political nostalgia, NC's important members of Congress, 2018 midterm analysis, ballot harvesting, Trump's deals, direct democracy, federal deficit, slavery and the Electoral College, Corbynism, 2019 Supreme Court term, 2020 Democratic presidential contest, NC redistricting case, politics of 1970s, impeachment, partisan foreign policy, NC budget stalemate, 2020 NC Senate race, coronavirus and the Establishment, coronavirus in NC, slavery reparations, 25 years of NC politics, 2020 House elections in NC, Fed and inflation, 2020 election, Electoral College reform, Democrats' advantages, NC school districts, Biden's economics, UNC and Hannah-Jones, felon voting rights.

Periodic Reviews:
Policy Studies Journal, *Southeastern Political Review*, St Martin's Press, *Legislative Studies Quarterly*, *American Politics Quarterly/Research*, Worth Publishers, *Journal of Politics*, *American Journal of Political Science*, *Social Science Quarterly*, Houghton-Mifflin, *Political Studies*, *Political Research Quarterly*, *The Independent Review*, National Science Foundation, *American Political Science Review*, Praeger, *Political Behavior*, Compass Point Books, *Journal of Agricultural and Resource Economics*, *Congress and the Presidency*, *Public Choice*, Congressional Quarterly Press, University of Michigan Press, *Politics* (U.K.), *Journal of Public Administration and Policy Research*, *State Politics and Policy Quarterly*, Oxford University Press, John F. Blair Publishing, Palgrave MacMillan, *Journal of Political Marketing*, W.W. Norton, *Government and Opposition*, *PS: Political Science and Politics*, Emerald Press, *American Behavioral Scientist*.

Testimony and Consultancy:

- NC House Committee on Elections
- Coalition to End Gerrymandering
- *CSI v. Moore*

Tenure and Promotion Reviews:
University of Minnesota-Morris, UNC-Greensboro, Clark University, Lehigh University, Clemson University, University of Arkansas, University of Houston-Victoria, UNC-Charlotte.

Group Membership and Professional Activism:

- Foundation for Individual Rights in Education (FIRE) – instrumental in securing NC State "Green Light" status
- Heterodox Academy

Periodic Blog Entries:

- LSE American Politics and Policy Blog, IHS Learn Liberty Blog, LegBranch, The James G. Martin Center for Academic Renewal, Brookings Institution's FixGov Blog

Public Addresses:

- Triangle International Visitor's Council/International Focus (1996-2015), numerous and regular talks on American politics given to academics, journalists, practitioners, and politicians from all over the world.
- NCSU Presbyterian Campus Ministry Peace Lunch Forum, 9/95, 11/98, 11/00, 11/04, 2/06, 3/08, 11/08, 11/16.
- CHASS Dean's Advisory Board, 4/96, 11/98.
- B'nai Brith, 10/96, 12/98, 3/04.
- Area elementary schools, 11/96, 11/00, 10/09, 6/11.
- Beth Myer Jewish Women's Group, 11/96.
- Area Rotary clubs, 11/96, 3/99, 5/99, 6/08x2, 1/10, 2/16, 9/16, 7/18, 3/19.
- NCSU Alumni Association, 10/96, 11/96, 1/99, 4/99, 9/00, 4/01, 3/04, 10/08, 5/09, 8/12, 9/16.
- NCSU Osher Lifelong Learning Program, 10/96, 10/98. 10/00, 1/08, 9/08, 10/19.
- International Visitor's Council moderator in debate between British M.P.s and North Carolina state legislators, 9/98.
- Area high schools, 1/98, 3/99, 9/00, 9/02, 10/02, 2/03, 09/04, 12/04, 2/16, 10/16, 1/18, 2/18, 9/18, 11/18, 1/19, 3/19, 5/19x2, 12/19, 10/20, 11/21.
- Wake County Men's Democratic Club, 11/98.
- Wake County Young Republicans, 3/99, 9/99.
- Wake County National Association of Retired Federal Employees, 4/99, 9/04, 9/14.
- John Locke Foundation, 6/99, 10/05, 1/08, 10/08, 6/09, 1/13, 7/15, 2/18, 2/19, 3/21, 10/21, 11/21.
- Hugh O'Brian Youth Leadership Seminar, 6/99, 6/01, 6/02, 6/09.
- Russian Leadership Program, 9/99, 5/02.
- Research Triangle English Speaking Union, 9/99.
- Canadian Parliamentary Interns, Washington, D.C., 4/00.
- Raleigh Jaycees Political Forum, 10/00.
- St. Augustine's College, 10/00.
- Area residents' association, 10/00.
- NCSU honors/scholars students/Caldwell Fellows/student leadership, 10/00, 4/02, 1/04, 2/04, 2/06 (D.C. trip), 10/08, 10/10, 10/12, 3/15, 9/15, 3/16, 10/16, 11/16, 11/18, 9/19, 10/20.
- Wake County Republican Men's Club, 11/00, 5/06, 1/07.
- Wake County Republican Women's Club, 11/00, 3/02, 9/05, 10/15, 10/19.
- Raleigh Chamber of Commerce, 11/00, 11/08, 3/12, 4/13.
- NCSU retired faculty, 1/01, 3/04, 11/08, 2/16.
- Area Kiwanis clubs, 3/01, 12/06, 2/17, 11/21.
- NCSU Graduate School Board of Directors, 3/01.
- Republican Club of Fearrington Village, 10/01.
- North Carolina Youth Legislative Assembly, 3/02.
- Westinghouse Retirement Group, 8/02, 2/03.
- NCSU CHASS-sponsored public event, 9/02, 10/08, 11/16, 9/19.
- North Carolina World Trade Association, 10/02.
- European Marshall Memorial Fellowship Program, 10/02.
- Area Optimist club, 1/03.

Other Professional Activities (cont.)
Public Addresses (cont.):

- Wake Forest Daughters of the American Revolution, 4/03.
- Adventures in Learning, 5/03.
- Wake County Citizens for Effective Government, 2/04.
- Moderator, North Carolina Republican Party gubernatorial debate, 4/04, 11/07.
- Group of Fifty, 11/04.
- NCSU Society for Politics, Economics and the Law, 11/04, 10/05, 2/08, 9/11, 9/12, 3/13, 4/14, 9/14, 9/15, 9/16, 10/18, 9/20.
- NC Leadership Forum, 11/05, 11/08, 11/09, 11/18, 11/19, 11/20.
- Quail Ridge Books, 1/06, 4/15.
- North Carolina Young Lobbyists Association, 5/06, 1/07.
- Raleigh Public Relations Society, 5/06.
- Western Wake Republican Club, 6/06, 1/08, 11/08, 10/10, 5/12, 10/14, 4/16, 4/18, 11/20.
- Young Presidents' Organization, 10/06, 11/19, 12/19.
- Adventures in Ideas, UNC-CH, 2/07.
- North Carolina Association of Electric Cooperatives, 3/07, 9/12.
- Raleigh Exchange Club, 9/07.
- North Carolina Aggregates Association, 6/08.
- U.S. Small Business Administration, 9/08.
- North Carolina Professional Lobbyists Association, 10/08, 11/14, 10/17, 10/19.
- NCSU CHASS "Back to School" Day, 10/08.
- Canadian Consulate, 10/08, 8/09, 2/10.
- NCSU's Friends of the Libraries, 10/08.
- Fulbright Visitors, 10/08.
- NC FREE, 10/08, 6/21.
- UNC Leadership Seminar for State Legislators, 11/08.
- NCSU Harrelson Lecture, 1/09.
- North Carolina Bar Association, 2/09.
- Garner First Presbyterian, 3/09, 3/11.
- NCSU University Club, 3/09.
- Foundation for Ethics in Public Service, 11/09.
- North Carolina Retail Merchants' Association, 4/10.
- Civitas Institute (now merged with Locke Foundation), 6/10, 12/18, 6/20.
- NCSU Office of International Affairs, 7/10.
- UNC System Council on Federal Relations, 8/10, 9/12.
- North Carolina Association of County Commissioners, 8/10, 11/10, 5/14.
- Wake Tech Community College Retirees, 10/10.
- North Carolina Free Enterprise Foundation, 10/10, 10/14, 4/16, 9/16.
- North Carolina Institute for Constitutional Law, 11/10.
- NCSU Development Coalition, 1/11, 10/16.
- Carolina Country Club History Group, 3/11, 10/11, 1/12, 9/12, 10/12, 11/12, 1/14, 2/14, 3/14, 10/14, 11/14, 9/15, 2/16, 3/16, 11/16, 3/17, 10/17, 2/18, 9/18, 11/18, 3/19, 11/19, 1/20, 2/20, 9/21.

Other Professional Activities (cont.)
Public Addresses (cont.):

- Morgan Stanley, 6/11, 10/16.
- NCSU Constitution Day, 10/11.
- Carolina Country Club, 1/12, 8/16.
- Cisco Systems, 3/12.
- National Council for International Visitors, 8/12.
- North Carolina Housing Finance Agency, 8/12.
- National Guard, 9/12.
- North Carolina Museum of History, 10/12, 8/13.
- North Carolina School of Science and Mathematics, 10/12.
- Japanese Embassy, 10/12, 2/20.
- NCSU Lawyers' Association, 11/12.
- AARP, 11/12.
- Bailey and Dixon LLP Election Conference, 10/13.
- UNC Law School, 9/14.
- North Carolina Community College Conference, 10/14.
- International Center for Journalists, 10/14.
- Poole College of Management, 11/14, 12/16.
- NC Beverage Association, 5/15.
- Martin Center (previously Pope Center) for Academic Renewal, 7/15, 10/15, 6/16, 7/17, 6/18, 9/18, 7/19, 8/20, 3/21, 8/21.
- NCSU Holtzman Forum, 11/15.
- Central Carolina Community College, 11/15.
- Great Decisions, Foreign Policy Association, 2/16.
- NCSU Cultural Exchange Network, 3/16.
- VFW-NCSU Leadership in the Public Sector panel, 4/16.
- Durham Central Park Cohousing Community, 5/16.
- Golden Corral group, 9/16.
- Singaporean Embassy, 9/16.
- American Forest and Paper Association, 11/16.
- NC League of Municipalities Board, 12/16.
- North Carolina Public Health Association, 5/17.
- NCSU Department of Social Work Spring Summit, 3/18.
- National Speech and Debate Association, 6/18, 5/19.
- Carolina Preserve, 2/19.
- National Affairs & R Street Institute, 6/19.
- Issues Confronting Our Nation, 10/19.
- British Embassy, 11/19.
- British American Business Council, 6/20.
- Hindu Society of North Carolina, Seniors' Club, 9/20.
- UK Political Tours, 10/20.
- Life Plan Group, 11/20.
- Foundation for Economic Education, 4/21.
- Carolina Meadows, 4/21.
- Sigma Chi NC STEM Fellowship, 7/21.

Other Professional Activities (cont.)
Public Addresses (cont.):

- Citizen Redistricting North Carolina, 10/21.
- Meridian International Center, 12/21.

Expert Report on North Carolina's Enacted Congressional Districts

Christopher A. Cooper

November 29, 2021

NCLCV v. Hall
21 CVS 15426
LDTX173

Exhibit #
Cooper 1
JH-12/30/2021
exhibitsticker.com

Introduction

My name is Christopher A. Cooper. I have been asked to provide a brief analysis of the partisan characteristics of North Carolina's congressional maps, enacted on November 4, 2021, for purposes of Plaintiffs' motion for preliminary relief in *Harper v. Hall*, No. 21 CVS 500085. I am conducting this analysis as a private citizen and am not speaking for my employer, nor am I conducting this work on university time, or using university resources.

I am the Robert Lee Madison Distinguished Professor of Political Science and Public Affairs at Western Carolina University, where I have been a tenured or tenure-track professor since 2002. I hold a PhD and MA in Political Science from the University of Tennessee, Knoxville and a BA in Political Science and Sociology from Winthrop University. My academic research focuses on state politics and policy, elections, and southern politics—with particular application to North Carolina. To date, I have published over 50 academic journal articles and book chapters, co-edited one book, and co-authored one book (both with the University of North Carolina Press). I teach courses on state and local politics, political parties, campaigns, and elections, southern politics, research methods, and election administration. In 2013, I was named the North Carolina Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and I have received Western Carolina University's highest honors in teaching (Board of Governors Teaching Award) and scholarship (University Scholar).

Much of my academic and applied research relates to North Carolina politics and policy and I am a frequent source for news media seeking comments about politics in the Old North State. My quotes have appeared in national and international outlets including the New York Times, Washington Post, Politico, BBC, and the New Yorker, as well as in North Carolina-based outlets including the News and Observer, Charlotte Observer, Asheville Citizen Times, Carolina Journal, Spectrum News, and National Public Radio affiliates in Chapel Hill, Charlotte, and Asheville. I have written over 100 op-eds on North Carolina, southern and national elections and politics, including pieces in the Atlanta Journal Constitution, NBC.com, the News and Observer, Charlotte Observer, and Asheville Citizen Times, and regularly give talks about North Carolina politics, North Carolina elections, and the redistricting process to groups throughout the state. I previously served as an expert witness in *Common Cause v. Lewis*.

I am being compensated at a rate of $300 per hour.

The bulk of the analysis that follows analyzes the consequences of the choices made district by district. Before proceeding into this analysis, however, a few points of context:

- North Carolina is, by virtually any measure, a "purple state" with healthy two-party competition. The North Carolina Governor is a Democrat, while the US Senators are Republicans. There are more registered Democrats than Republicans in the state, and in the 2020 election, the two-party vote share difference between Trump and Biden was the smallest of any state that Donald Trump won.

- North Carolina does not show as much evidence of "natural clustering" as other states. According to Stanford University political geographer Jonathan Rodden, "Due to the presence of a sprawling knowledge-economy corridor, a series of smaller automobile cities with relative low partisan gradients, and the distribution of rural African Americans, Democrats are relatively efficiently distributed in North Carolina at the scale of congressional districts."[1] In other words, massive partisan disparities in election outcomes in favor of one party or the other cannot be discounted as simply a result of where Democrats and Republicans happen to live.

- Gerrymandering, drawing districts to benefit one party at the expense of the other, is generally accepted as a threat to democracy in North Carolina and across the nation. This statement is true regardless of partisanship. For example, a 2018 Elon Poll found that just 10% of registered voters in North Carolina believe the current redistricting system is "mostly fair." A recent op-ed in the *News and Observer* by Republican Carter Wrenn and Democrat Gary Pearce illustrates bi-partisan agreement on the evils of gerrymandering in clear terms. They explain, "We agree that gerrymandering is a major problem that undermines the foundations of our democracy. We agree that districts shouldn't be drawn to help one political party, no more than college basketball games should be rigged to favor one team."[2] The preference for fair maps is not a partisan one.

[1] Rodden, Jonathan, Why Cities Lose (New York: Basic Books, 2019), 173.

[2] Gary Pearce and Carter Wrenn. "We're usually on opposite sides of political battles. But we agree on NC voting maps." News and Observer. October 21, 2021.

While the district-by-district analysis is key to understanding the ways in which the map will translate into advantage for one party or the other in any given district, the map is best thought of as a single organism, rather than 14 separate congressional districts---when one district moves in one direction, another district must shift in response. As a result, it is worth pausing and considering some of the general characteristics of the map before moving into a district-by-district analysis.

- North Carolina earned an additional congressional seat because of population growth that occurred mostly in urban areas: according to an analysis of U.S. census data by the News and Observer, more than 78% of North Carolina's population growth came from the Triangle area and the Charlotte metro area.[3] Despite that fact, the number of Democratic seats actually *decreases* in the current map, as compared to the last map. The last map produced 5 Democratic winss and 8 Republican wins; this map is expected to produce 3 Democratic wins, 10 Republican wins and 1 competitive seat.

- Democratic strongholds Mecklenburg, Guilford, and Wake Counties are each divided across three districts, despite the fact that there is no population-based reason to divide them this many times. In the previous map, Mecklenburg was divided into two districts, Wake into two districts, and Guilford fell completely in one district. The strategic splits in the enacted map ensure that large numbers of voters will have no chance of being represented by a member of their own party. These splits will also lead to voter confusion and fractured representational linkages. The shaded red-and-blue maps that follow this introductory section provide a graphical representation of each of these county splits.

- The map produces geographic contortions that combine counties in ways that, in some circumstances, have never existed before.

- The double-bunking that occurs in the enacted map advantages the Republican Party. A Republican (Virginia Foxx) and a Democrat (Kathy Manning) are both drawn into in an overwhelmingly Republican district, thus virtually guaranteeing that the Democrat (Manning) will lose her seat. There are no cases where two Republican incumbents seeking re-election are double-bunked. The map also produces at least one district with no incumbents, but that district overwhelmingly favors the Republican Party.

- Neutral, third-party observers have been uniform in their negative assessment of the map. For example, The Princeton Gerrymandering Project gives the map an "F" overall, an "F" in partisan fairness and a "C" in competitiveness. Dave's Redistricting App assess the map as "very bad" in proportionality and "bad" in terms of competitiveness. Both of these groups are nonpartisan and have given similar grades to Democratic gerrymanders in other states.

---

[3] David Raynor, Tyler Dukes, and Gavin Off. "From population to diversity, see for yourself how NC changed over 10 years." News and Observer, Oct. 18, 2021, https://www.newsobserver.com/news/local/article253546964.html.

In the text that follows, I refer to the "current" maps as the maps that were used in the 2020 election and the "enacted" maps as the maps that have been approved by the North Carolina General Assembly for use in the 2022 elections. While I conducted all of the analysis that follows and wrote all of the verbiage, the shaded red-and-blue maps were produced by John Holden, a GIS expert, using a composite measure of partisanship that I selected and describe below.

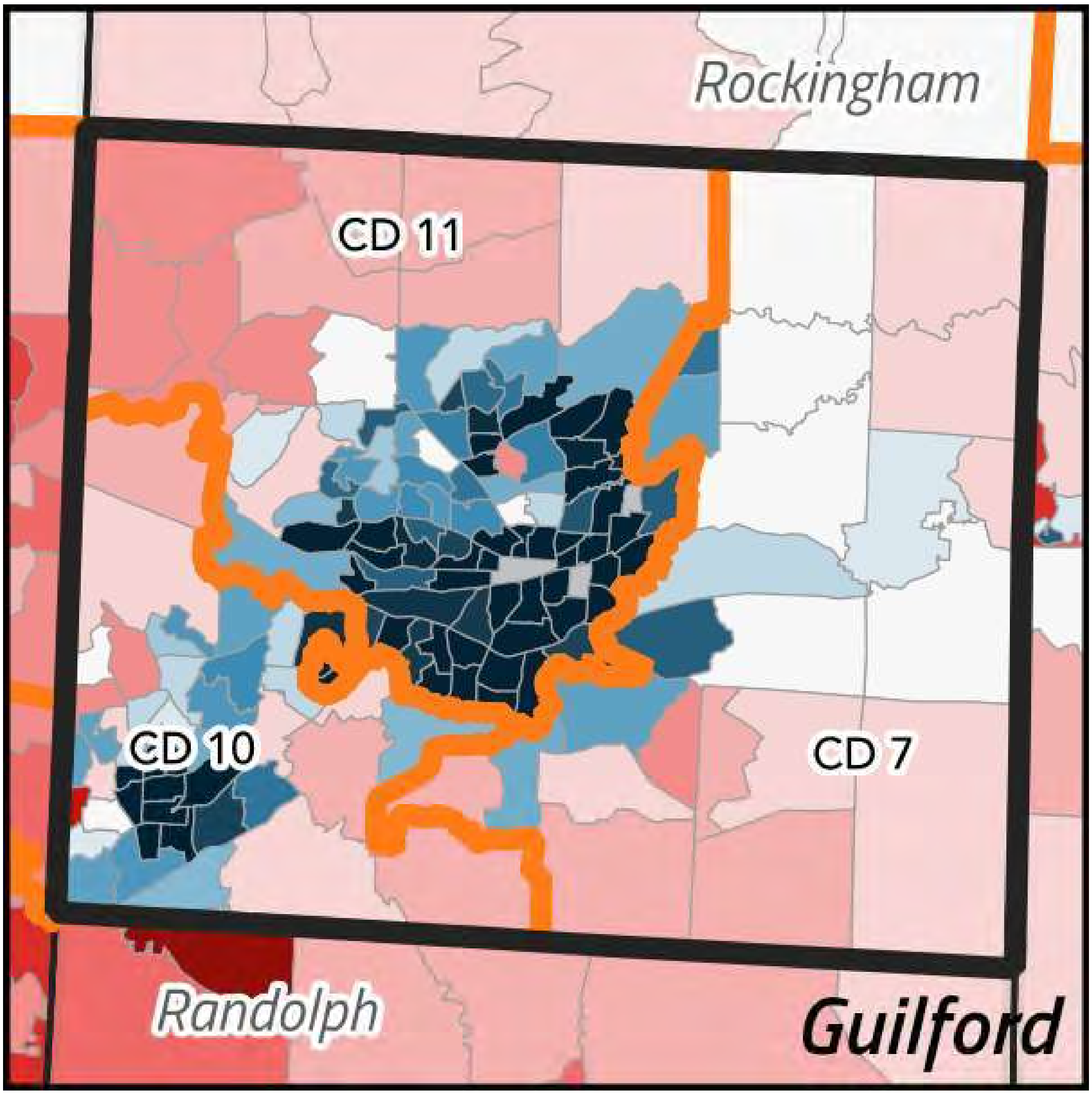
I use three different metrics in the analysis that follows. The first is the Cook Political Report's Partisan Voter Index (PVI), a standard metric of the expected "lean" of a district using a composite of past elections. The second is a metric created for this analysis that combines the results of the Secretary of Labor and Attorney General races, the two closest Council of State races in North Carolina in 2020, into one measure, which I term the Competitive Council of State Composite (CCSC). This measure allows us to use relatively low-profile elections to get a sense of the "true partisanship" of the district. It is presented below as the raw difference in votes and is used in the shaded red-and-blue maps that follow. Finally, I mention the percent of the electorate that voted for Donald Trump in the 2020 election to give yet another sense of the partisan lean of the district. As the table below shows, the metrics all tell a similar story: the enacted map will produce 10 Republican seats, 3 Democratic seats, and one competitive seat. At most, the enacted map could be expected to elect four Democrats to office in 2022—fewer than in the current map and far below Democratic representation statewide, or the results of other recent statewide elections.

Table 1. Summary Data for Each Enacted Congressional District

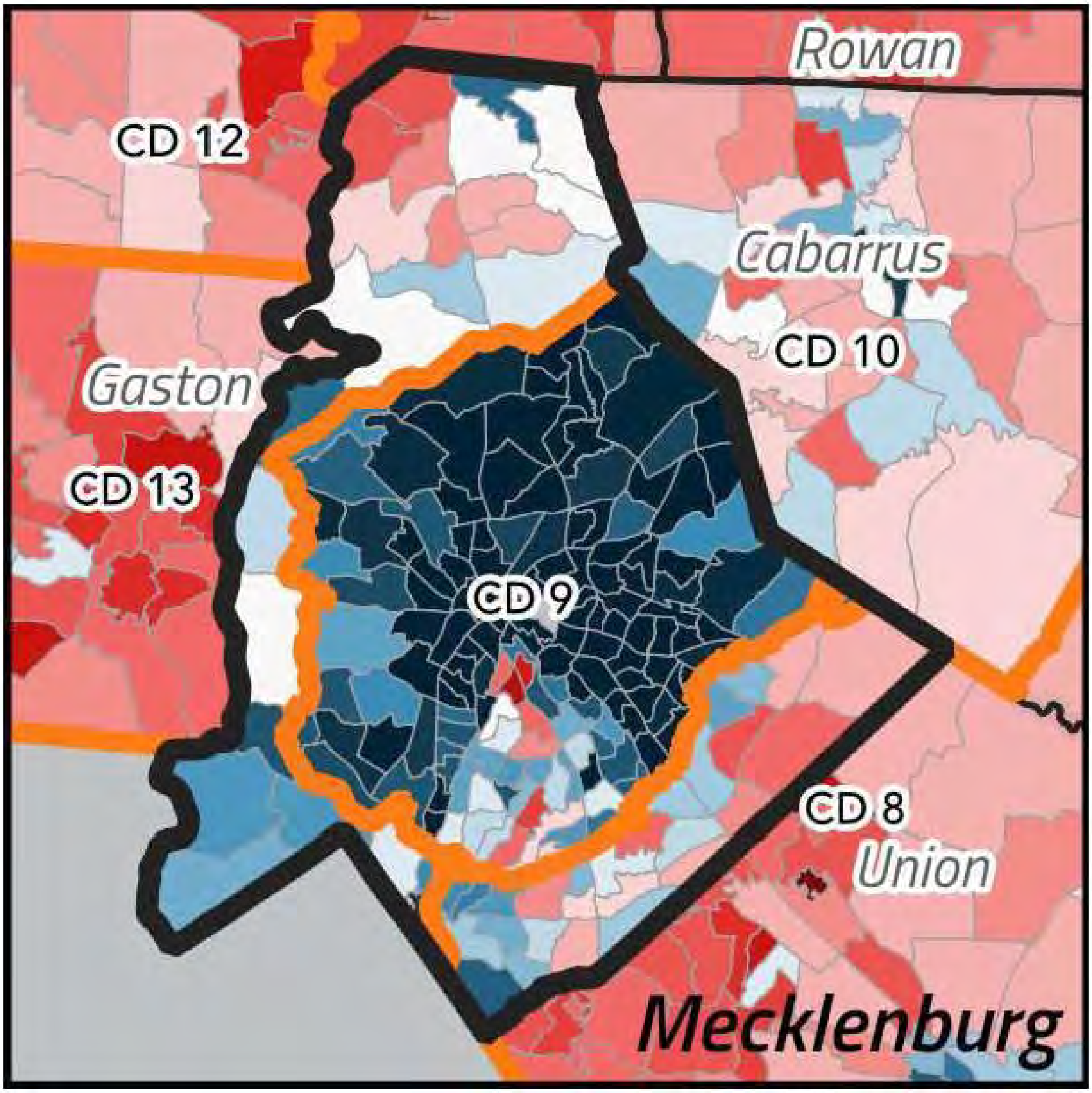
District	PVI	CCSC	Trump Perc
1	R+10	R + 98,969	57%
2	Even	D +40,396	48%
3	R+10	R +111,451	58%
4	R+5	R + 28,045	53%
5	D+12	D +227,327	34%
6	D+22	D + 374,786	25%
7	R+11	R + 115,682	57%
8	R+11	R +125,842	57%
9	D+23	D + 325,717	25%
10	R+14	R + 156,833	60%
11	R+9	R + 94,407	57%
12	R+9	R + 102,404	56%
13	R+13	R + 150,187	60%
14	R+7	R + 58,387	53%

I begin by showing shaded red-and-blue maps demonstrating the trisection of Wake County, Mecklenburg County, and Guilford County. These maps show county lines in black, VTD lines in gray, and district lines in orange. The red and blue shading represents the relative vote margin using my CCSC composite—the composite of the Secretary of Labor and Attorney General races in North Carolina in 2020—in each VTD, with darker blue shading representing larger Democratic vote margins and darker shades of red indicating larger Republican vote margins (both normalized by acreage).

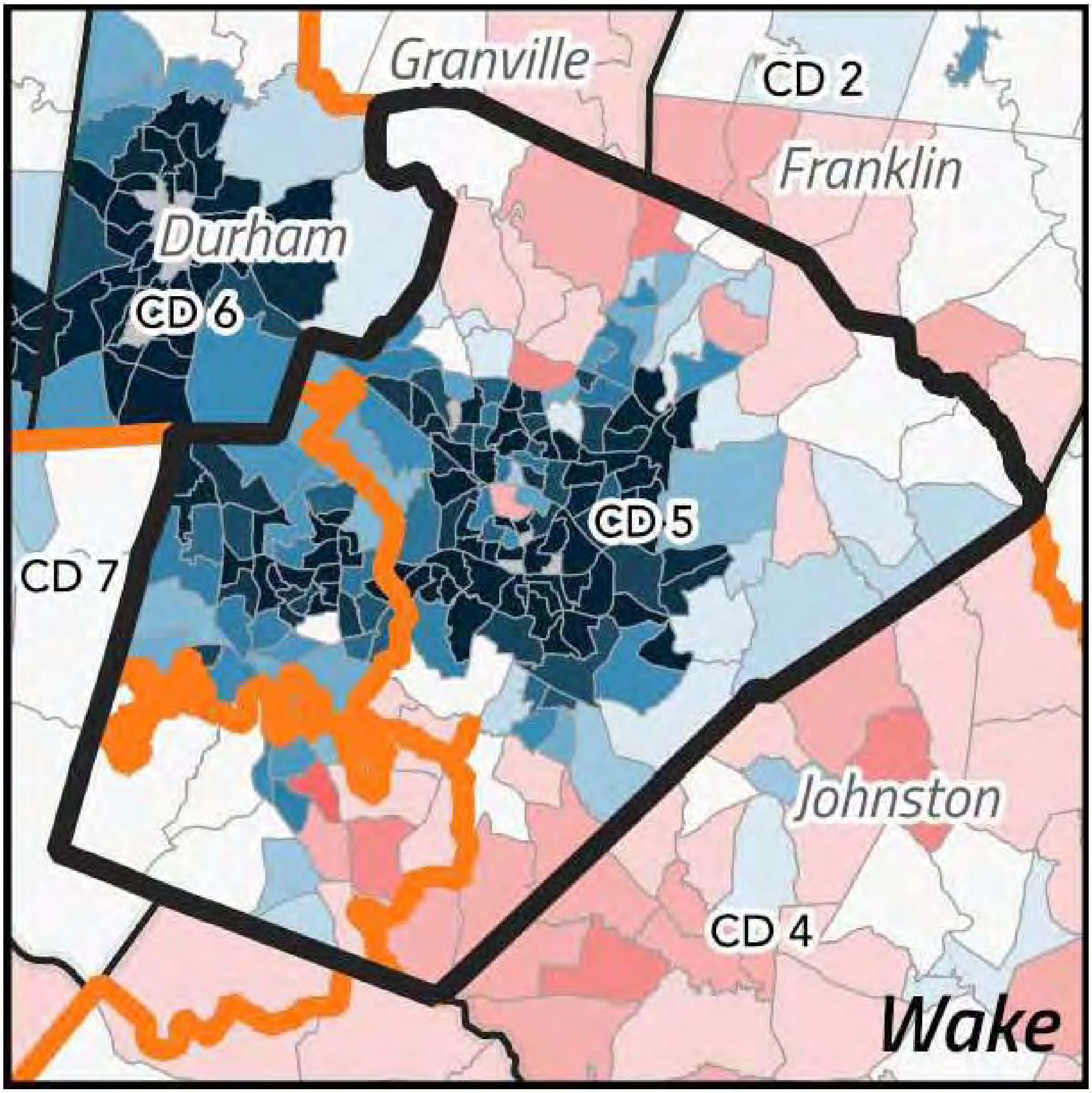
Map 1. Close-Up of Wake County VTD CCSC estimates across three districts



Map 2. Close-Up of Mecklenburg County VTD CCSC estimates across three districts



Map 3. Close-Up of Guilford County VTD CCSC estimates across three districts

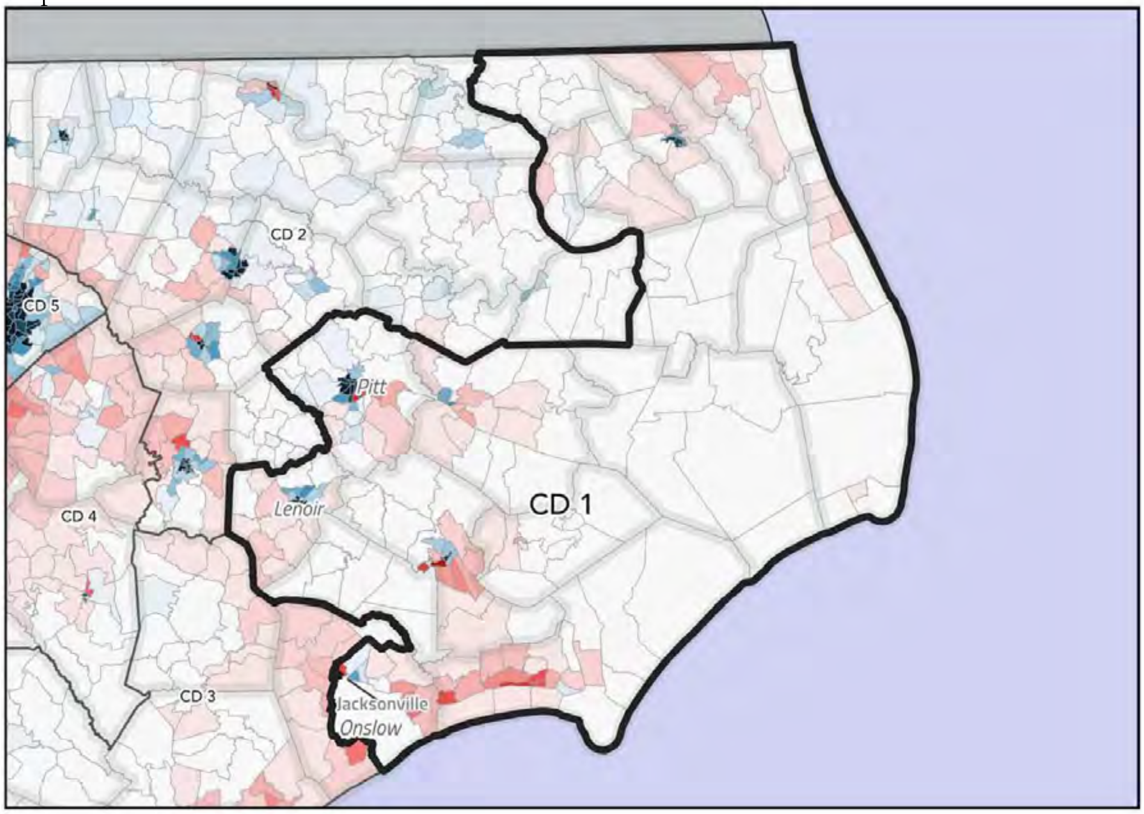


NC-1

The enacted 1st congressional district is mostly comprised of the current NC-3, but also includes part of the current NC-1. Most potential congressional districts in this part of North Carolina would likely lean towards the Republican Party, but to create extra advantage for the Republican Party in other parts of the map, the current map brings the Democratic-leaning areas of Pitt County into District 1, thus removing them from NC-2 and allowing NC-2 to become much more competitive for the Republican Party.

Despite moving the district line westward to include the Democratic portion of Pitt County, the enacted district remains virtually a guaranteed Republican victory with a PVI of R+10 (the current NC-3 is R+14). No Democratic member of Congress in the country represents a district that leans this far towards the Republican Party.

Map 4: VTD CCSC estimates for NC-1



NC-2

The enacted 2nd congressional district includes the core of the current NC-1, along with portions of the current NC-4 and NC-13 districts. The area that largely comprises the new 2nd district is currently represented by Democrat GK Butterfield and is considered a D +12 district by the Cook Political Report, making it a safe Democratic seat. Butterfield has the longest uninterrupted tenure of any member of North Carolina's congressional delegation. Under the enacted map, however, Butterfield's district changes radically, loses many of its Democratic strongholds (including the aforementioned loss of the Democratic areas in Pitt County) and now picks up enough Republican voters to move the district to "even," according to the Cook Political Report. For example, it picks up Caswell County, which does not include a single Democratic-leaning VTD, according to the 2020 Attorney General/Secretary of Labor "CCSC" composite in the map shown below. The 2020 Presidential vote share and composite score reinforce that this is an extremely competitive district. This is an enormous shift for what was formerly a Democratic stronghold.

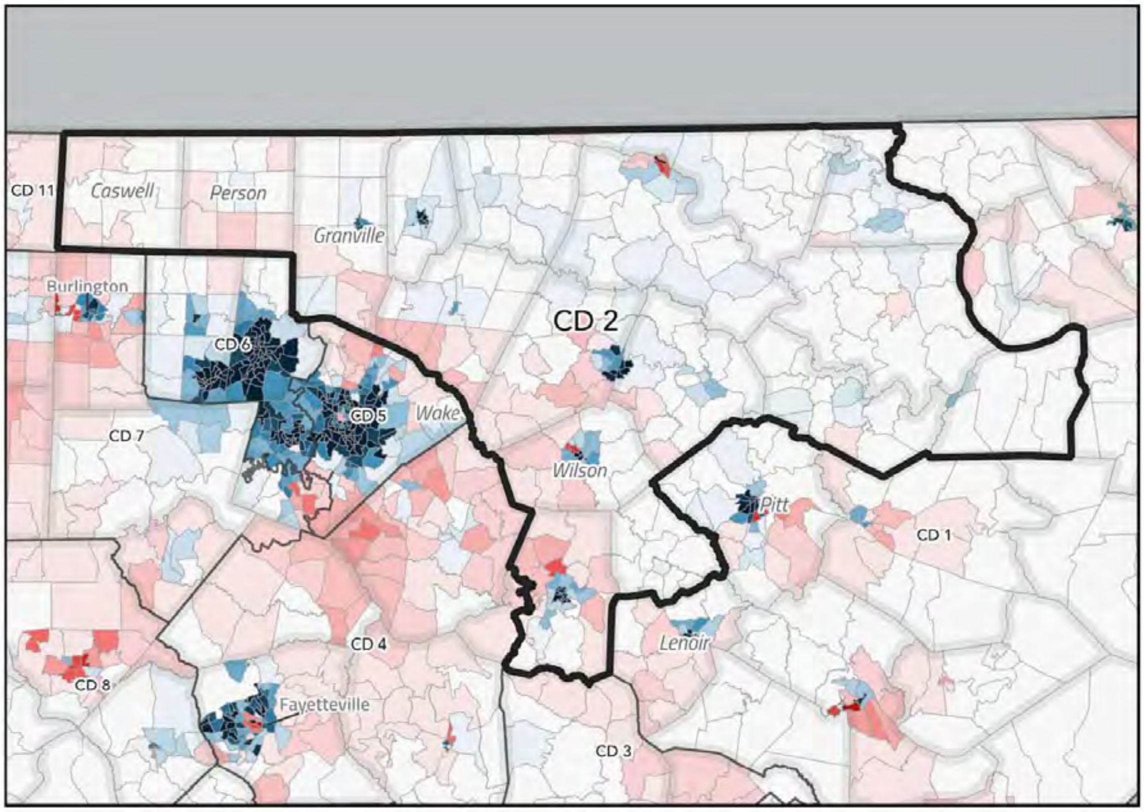
In addition to producing a clear partisan shift, the district is difficult to understand from a communities of interest perspective. The enacted district no longer includes any of Pitt County nor the campus of East Carolina University, which provided much of the economic engine of the district, and now stretches from the Albemarle Sound to the Raleigh-Durham-Chapel Hill metropolitan area, and eventually terminates in Caswell County, just northeast of Greensboro. Notably, Washington County and Caswell Counties have never been paired together in a congressional map in the history of North Carolina, further illustrating how little these counties have in common.

At a micro-level, the changes will split communities in important ways. For example, the cut-out in Wayne County, just west of Goldsboro, NC, splits the students and families in Westwood Elementary School (which is located in NC-2) into two separate districts (NC-2 and NC-4). At one point, NC-2 passes through a narrow cut-off between the Neuse River to Old Smithfield Road that is less than one-third of a mile wide.

After the maps were enacted, G.K. Butterfield announced that he will not seek re-election,[4] making the district even more likely to shift to the Republican Party. If the Republicans take over this seat, it will be the first time that this part of North Carolina has been represented by a Republican since the late 19th Century.

[4] Bryan Anderson, "Democrat Rep. Butterfield to Retire, New District is a Toss-Up." Associate Press News. https://apnews.com/article/elections-voting-north-carolina-voting-rights-redistricting-e221c0732f457b2273f54ef102424eca

Map 5. VTD CCSC estimates for NC-2



NC-3

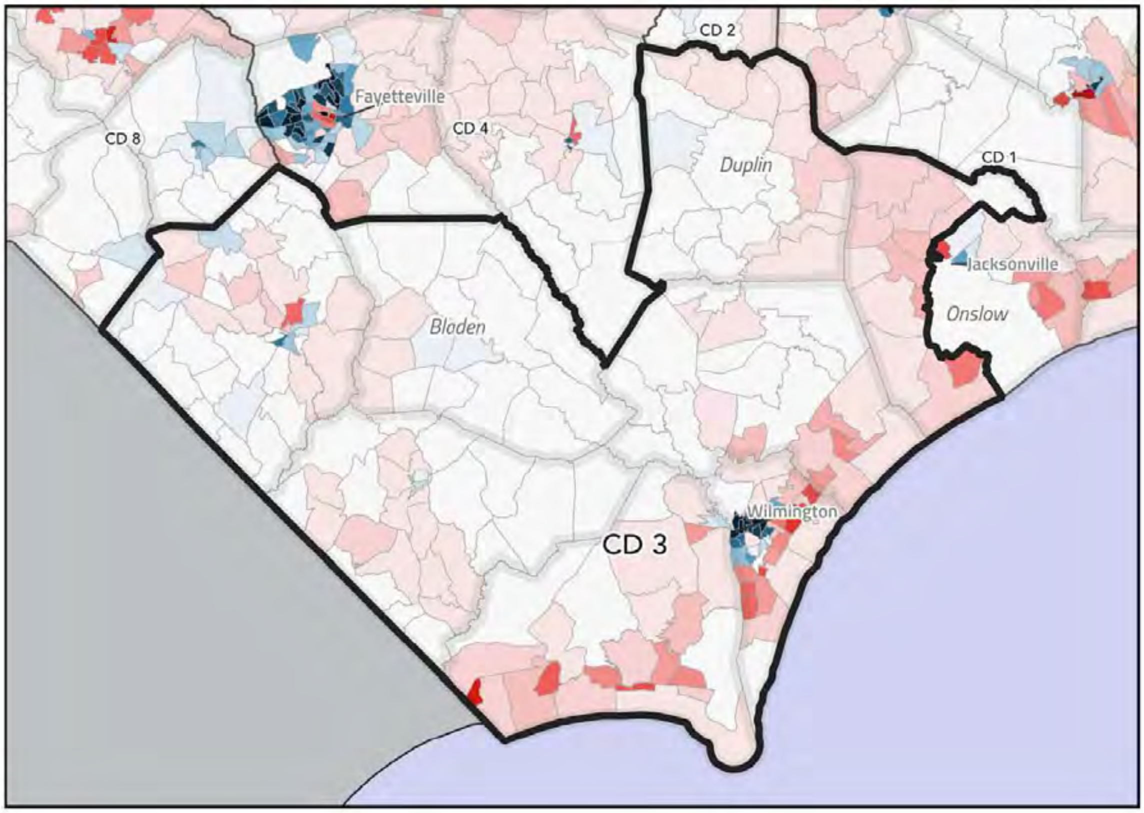
The enacted third congressional district is mostly carved out of the current 7th congressional district, but also includes portions of the 3rd, and 9th districts. The current 7th district is considered R+11 by the Cook Political Report.

This district once again denies North Carolina's Sandhills a consistent district of their own, despite repeated calls during the redistricting process,[5] and instead places portions of the Sandhills with the coastal enclave in and around Wilmington. The enacted map also creates an odd appendage in Onslow County that, as described in the section on NC-1, makes little sense from a communities of interest perspective.

The enacted district will almost certainly elect a Republican. It is slightly less Republican than the current NC-7 but still is considered R+10 district by the Cook Political Report, favored the Republicans by over 110,000 votes in the 2020 Attorney General/Secretary of Labor "CCSC" composite, and Donald Trump won the district with 58% of the vote. It is currently represented by Republican David Rouzer and is expected to remain in Republican hands.

[5] See, for example, Dreilinger, Danielle, "1 woman, 1 North Carolina address, 5 congressional districts. As North Carolina prepares to add a 14th congressional seat, Sandhills residents asked: why can't it be theirs? *Fayetteville Observer*. Nov 5, 2021.

Map 6. VTD CCSC estimates for NC-3



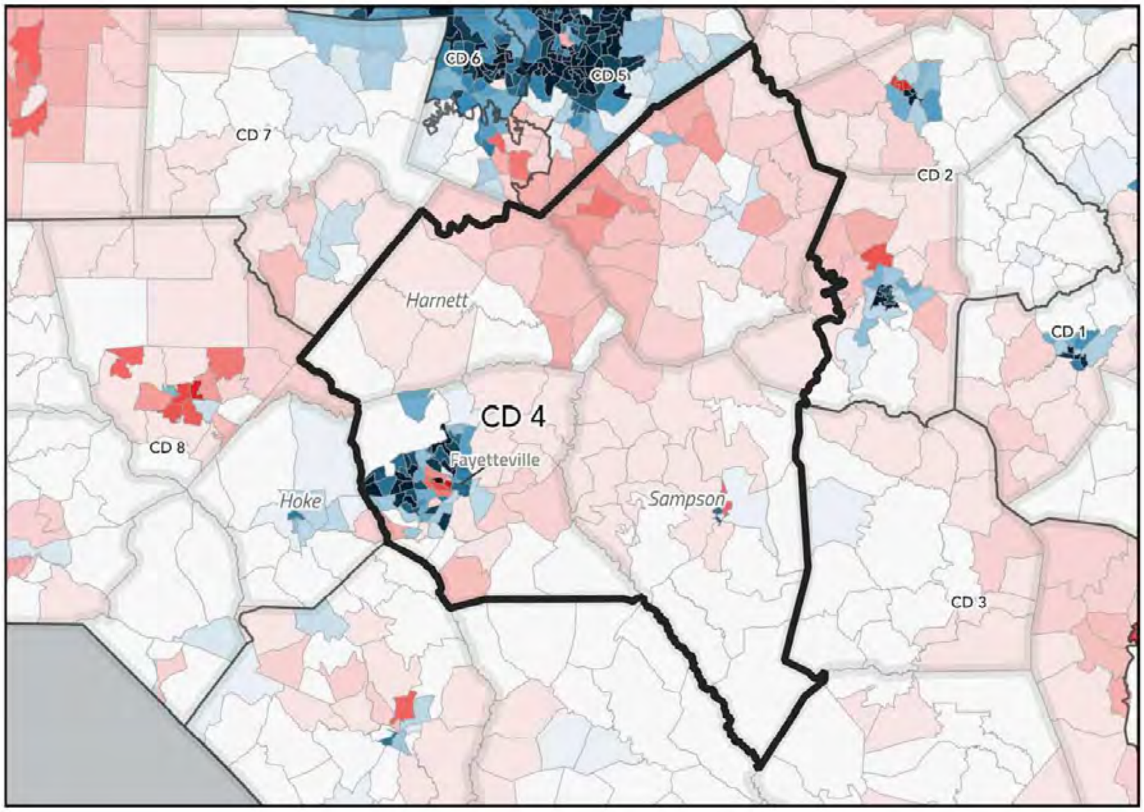
NC-4

The enacted 4th congressional district is carved out of a pocket of North Carolina that includes Johnston County and a portion of Harnett County, both of which are adjacent to Wake County, as well as portions of the Sandhills. The district is carved out of leftover portions from districts 7 and 8 which were R+11 and R+6, respectively. It combines the Democratic-leaning area of Fayetteville with those areas to create a Republican-leaning district.

In addition to the carve out of Republican-leaning VTDs in Wayne County referenced above, this district takes a series of confusing jogs in the Northwest part of Harnett County. A citizen driving Southwest on Cokesbury Road would begin in NC-7, then rest on the line between NC-7 and NC-3, then into NC-4, then back on the line between the two, just before Cokesbury turns into Kipling Road whereupon the driver would move back into NC-7.

This district, which has no incumbent, is considered an R+5 district by the Cook Political Report, gave 53% of its vote share to Donald Trump in 2020, and gave an advantage to Republicans of about 28,000 votes in the 2020 Attorney General/Secretary of Labor "CCSC" composite.

Map 7. VTD CCSC estimates for NC-4

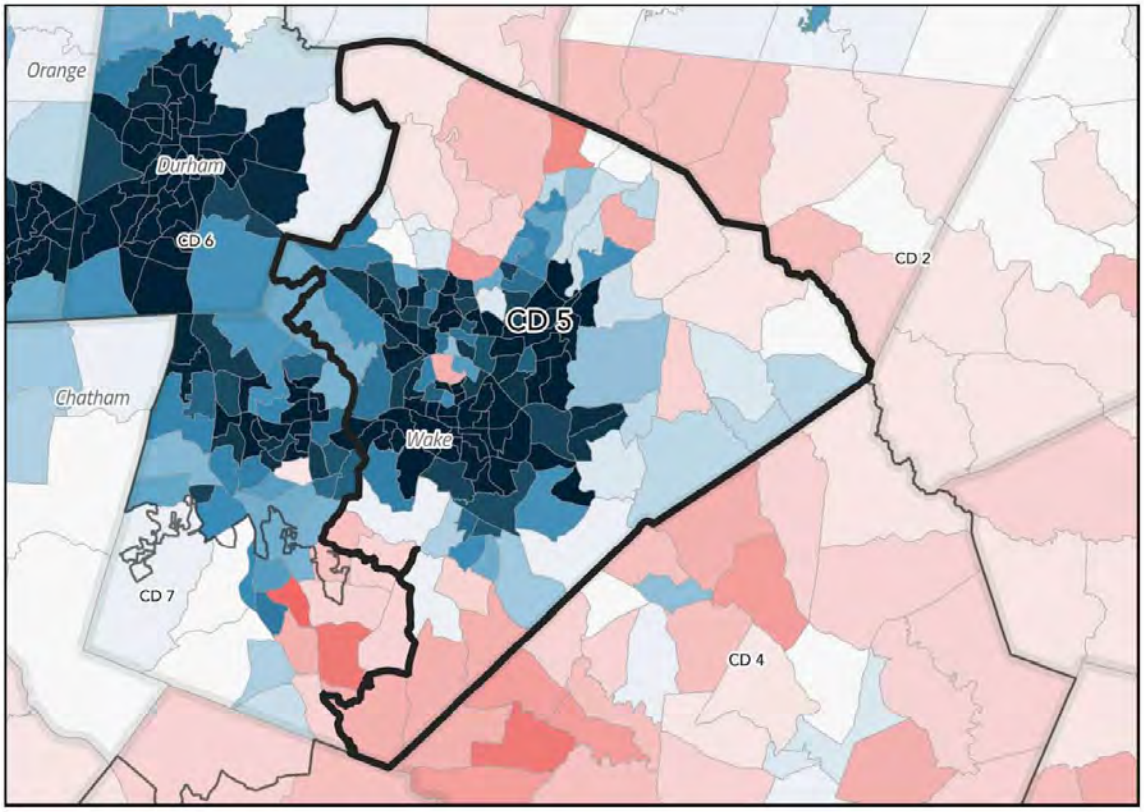


NC-5

The enacted map cracks Democrats in Wake County into three districts. Unlike NC-6 and NC-7, NC-5 is situated completely within Wake County and is made up of portions of current NC-2 and NC-4, districts that were D+12 and D+16. The effects of this are to pack Democratic voters into one district, thus increasing the probability that Republicans can win at least one of the adjacent districts. The enacted district is rated by the Cook Political Report as D+12, the CCSC shows a Democratic advantage of over 227,000 votes and Donald Trump won just 34% of the vote.

This map clearly splits communities of interest. In one particularly egregious example, a small vein runs up Fayetteville Road by McCuller's Crossroads in Fuquay-Varina, where the vein itself is in NC-7 and the areas on either side of it are in NC-5.

Map 8. VTD CCSC estimates for NC-5

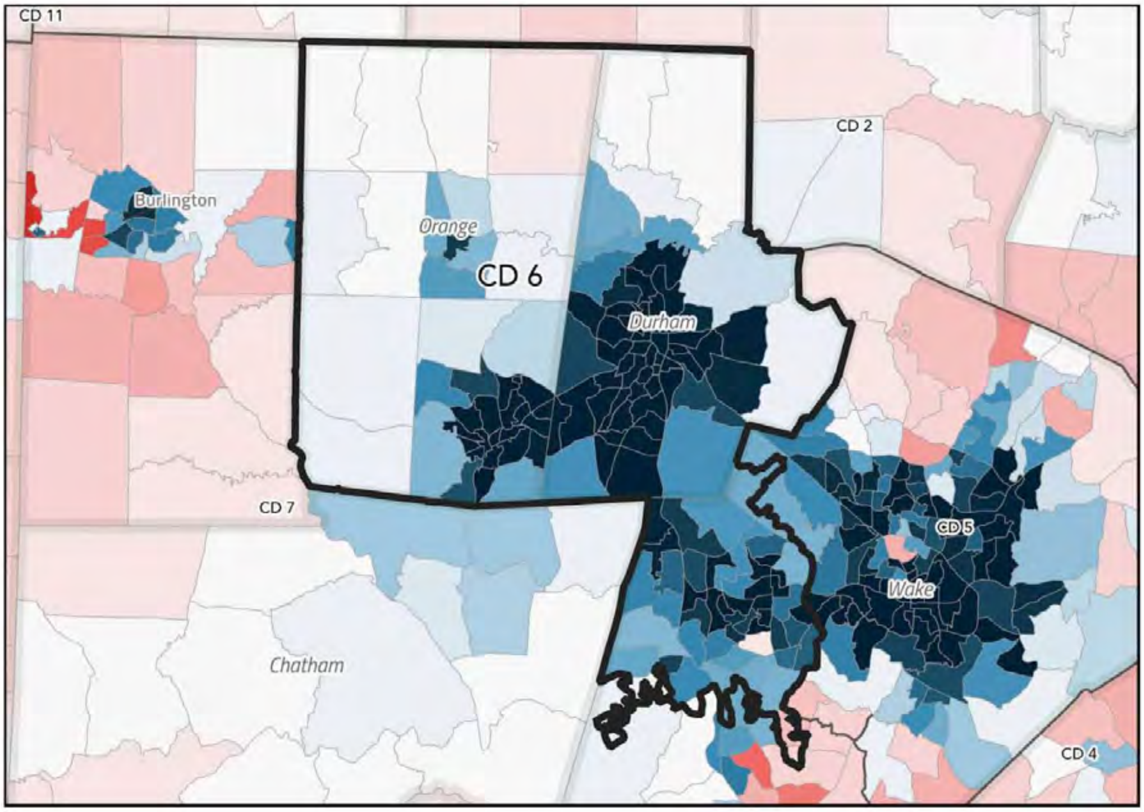


NC-6

The 6th district packs all of Orange, Durham counties and part of Wake County together into one overwhelmingly Democratic district, which is created out of portions of the current Districts 4 and 2 (previously D+16 and D+12, respectively). As the map below demonstrates, the district only includes four marginally Republican VTDs, according to the 2020 Attorney General/Secretary of Labor "CCSC" composite. Cook Political Report estimates this to be a D+22 district, Democrats had more than a 374,000 vote advantage in the CCSC and Donald Trump won only 25% of the vote in 2020. This district packs a greater proportion of Democratic voters in a single district than any district from the previous map. This district, like NC-5, includes Wake County, which is divided across three districts in the enacted map. The packing of Democrats in this district enables adjacent districts, in particular NC-7, to be drawn in ways that make it easier for Republican candidates to win.

The contours of this district border with NC-7 on the southern end splits communities of interest in almost comical ways. In one example, a person traveling south on New Hill Olive Chapel Road would, in a matter of a few miles, move from enacted NC-7 to the line between NC-6 and -7, back into NC-7, through NC-6, back into NC-7, back to the border between the two, back into NC-7, back to the border between the two, then back into NC-7. The contours of these lines are confusing to voters, and, as the map demonstrates, serve to pack as many Democratic precincts as possible into NC-6.

Map 9. VTD CCSC estimates for NC-6

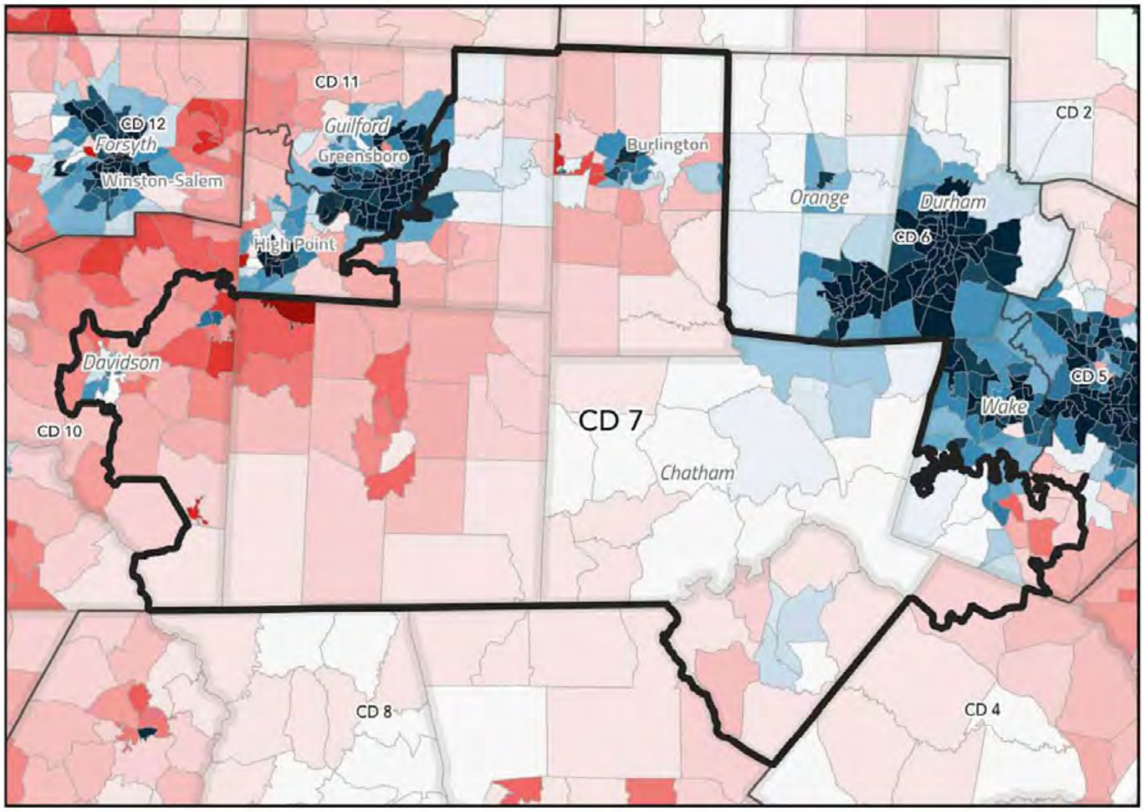


NC-7

The enacted 7th district includes the Republican-leaning Randolph, Alamance, Chatham and Lee Counties as well as portions of Guilford, Wake, and Davidson Counties. It is carved out of districts 13, 6, 4 and 2 from the current map. This district as it is drawn splits both Guilford and Wake Counties (each of which of is divided three times in the map as a whole). Despite including portions of two of the most Democratic counties in North Carolina, the district studiously avoids the Democratic-leaning areas of both counties. The eastern portion of the district in Wake County, near Apex, takes the unusual and confusing contours described in the description of NC-6 above.

The enacted NC-7 is considered R + 11 by the Cook Political Report, it gave Republicans a 115,682 vote advantage in the CCSC, and Donald Trump won 57% of the vote in this district. A Democratic candidate has virtually no chance of victory in the enacted 7th.

Map 10: VTD CCSC estimates for NC-7

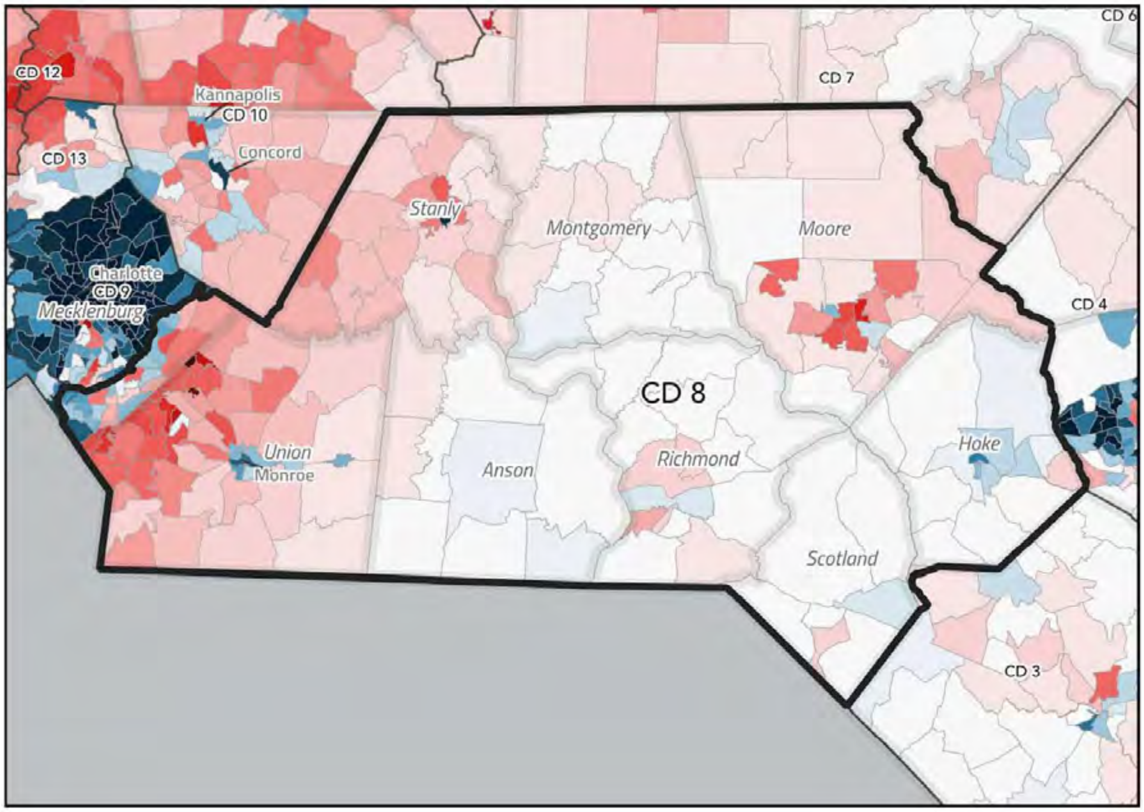


NC-8

The 8th congressional district stretches from the Sandhills into Mecklenburg County and includes portions of the current 9th, 12th, and 8th districts. The core of the district comes from NC-9, currently R+6. The enacted NC-8 includes the entirety of Scotland, Hoke, Moore, Montgomery, Anson, Union, and Stanley counties as well as the southern and eastern edge of Mecklenburg County. Although it includes portions of Mecklenburg County, one of the most Democratic-leaning areas in the state, as well as Democratic municipalities of Union, Anson, and Hoke, the 8th district is unlikely to elect a Democrat under any reasonable scenario. The enacted map stops just shy of the some of the darkest blue VTDs in Mecklenburg County.

The Cook Political Report calls the enacted NC-8 an R+11 district, the CCSC shows that the Republican candidate garnered over 115,000 more votes than the Democratic candidates for the two closest Council of State races, and Donald Trump won approximately 57% of the vote in the 2020 election.

Map 11: VTD CCSC estimates for NC-8



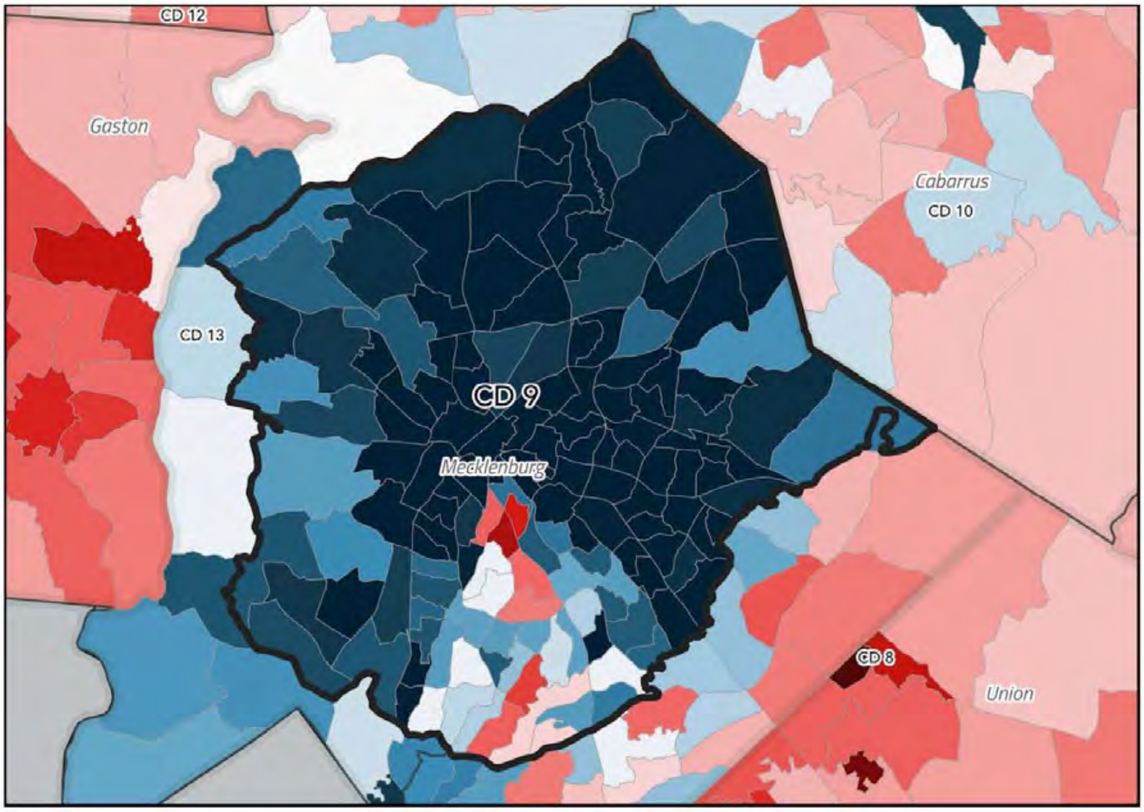
NC-9

The core of the enacted 9th congressional district come from NC-12, but it also includes portions of the current NC-9. The result is the most packed district in the enacted map. The Cook Political Report rates the enacted NC-9 as a D+23 district, meaning that it leans more heavily towards the Democratic Party than any district in the last map. Donald Trump won just 25% of the vote in this district in the 2020 Presidential election and the CCSC indicates that the Democrats won over 325,000 more votes than the Republicans in the two closest Council of State races in 2020.

As with all examples of packing, the key to understanding this district is its effects on the surrounding districts. By ensuing that the Democratic candidate in NC-9 wins by an overwhelming margin, Republican voters will be more efficiently distributed across other districts, where they can affect the outcome. This ensures that neighboring district 8, for example, will not be competitive. This also has the effect of ensuring that Republican voters in NC-9 have no chance of securing representation from a member of their own party.

The geographic contortions of this district are most apparent on its western edge, where a mere 8 miles separates the western edge of district 9 and the Mecklenburg County line.

Map 12. VTD CCSC estimates for NC-9

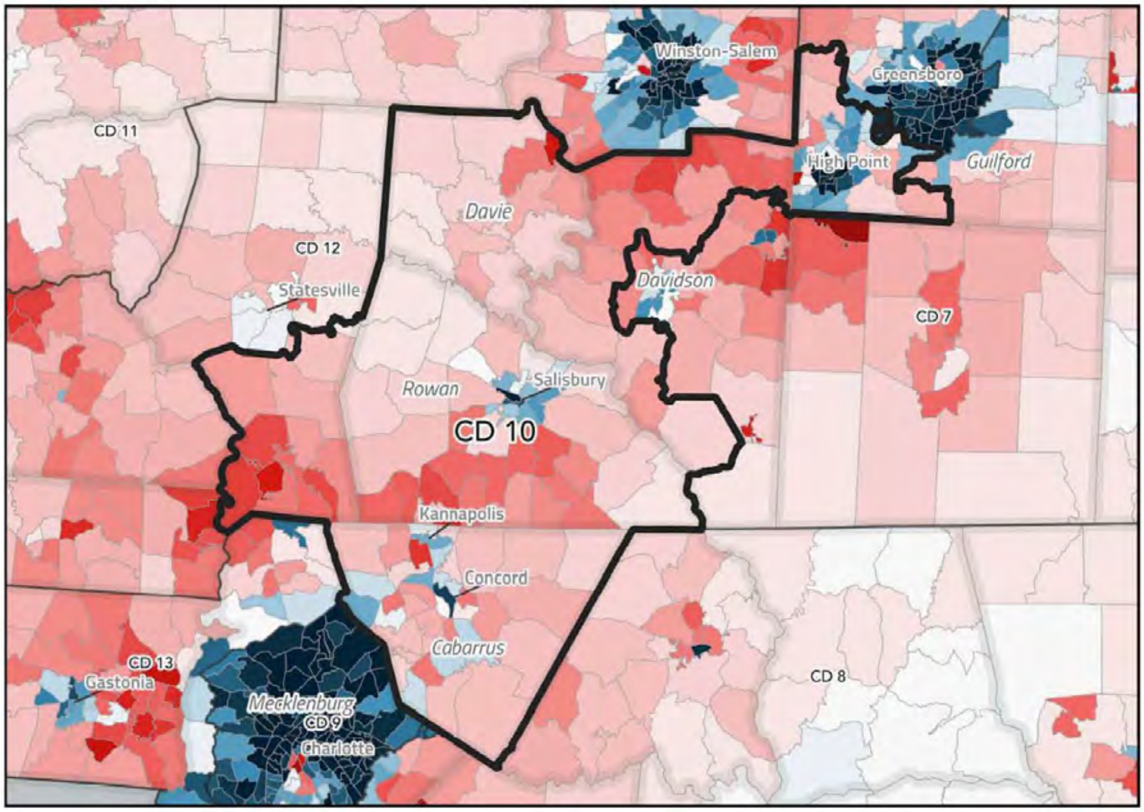


NC-10

The enacted NC-10 includes all of Rowan, Cabarrus and David County and parts of Iredell, Davidson and Guilford Counties. It is drawn out of portions of the current 10th, 9th, 6th, and 13th districts. Despite the inclusion of carefully curated portions of Democratic Guilford County, this district is a safe Republican seat and effectively removes any possibility that Democratic voters in High Point, Salisbury, Kannapolis, Concord, and Cabarrus can elect a member of their own political party. The Cook Political Report rates this district as R+14, the CCSC indicates that Republicans won more than 156,000 additional votes in the two key council of state races, and Donald Trump won over 60% of the Presidential vote in the enacted district.

The enacted NC-10 includes High Point, while NC-11 includes most of Greensboro and NC-12 contains Winston-Salem, meaning that the enacted map splits all three points of North Carolina's Piedmont Triad into separate congressional districts that favor Republicans. In the current map, this community of interest is together in NC-6, represented by Democrat Kathy Manning.

Map 13: VTD CCSC estimates for NC-10



NC-11

The enacted 11th congressional district is carved out of the 5th, 10th, and 6th districts. This map places a portion of Guilford County, including the City of Greensboro in a district with Rockingham, Stokes, Surrey, Alleghany, Ashe, Wilkes, Caldwell, and Alexander counties as well as a tiny boot-shaped sliver of Watauga County.

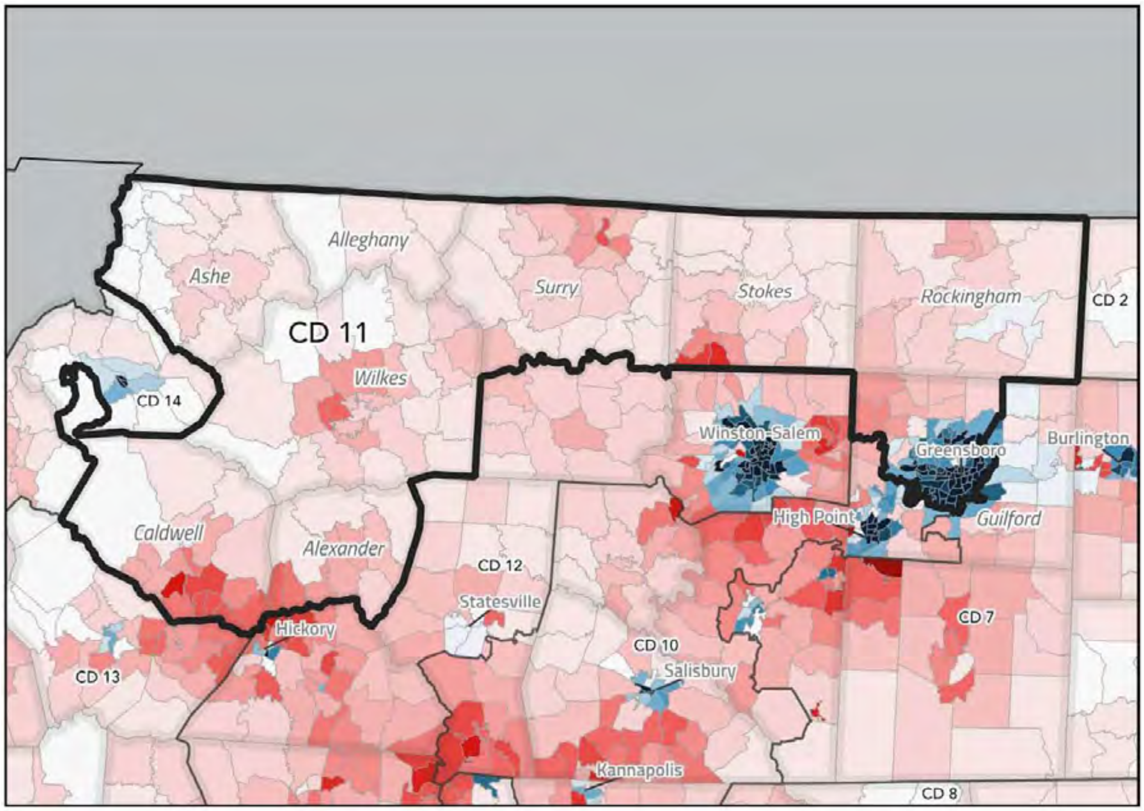
As discussed elsewhere, the enacted map splits Guilford County across three districts (the 10th, 11th, and 7th) and puts all three points of the Piedmont triad in separate districts. By placing most of Greensboro in this overwhelmingly Republican district, this ensures that the City of Greensboro, among the most Democratic and racially diverse cities in the state of North Carolina, will not be represented by a Democrat.

The enacted district is rated by Cook as R+9, 57% of the district voted for Donald Trump in the 2020 election, and Republicans held a 94,000 vote lead in the two closest Council of State elections. No Democrat in the current Congress represents a district that leans this heavily Republican.

It is difficult to imagine any sense in which this district has shared interests. Geographically, it spans radically different parts of the state. Greensboro is firmly in the Piedmont, resting at under 900 feet elevation. Watauga and Ashe counties, by comparison, reside in the high country, with elevations that consistently run above 5500 feet. The corners of the district have different area codes, are served by different media markets, and share virtually no characteristics in common other than the fact that they are both within North Carolina. In the history of North Carolina, Caldwell and Rockingham Counties have never shared a congressional representative.

In addition to its geographic span, the enacted district stands out for its double-bunking of Republican Virginia Foxx and Democrat Kathy Manning. To shoe-horn Virginia Foxx into the new district, the mapmakers carved out a tiny sliver of Watauga County to allow her house to fall into the redrawn district. This passage is so narrow, in fact, that is connected by a stretch of land that is roughly 3 miles wide and requires a traverse of the Daniel Boone Scout Trail.

Map 14: VTD CCSC estimates for NC-11

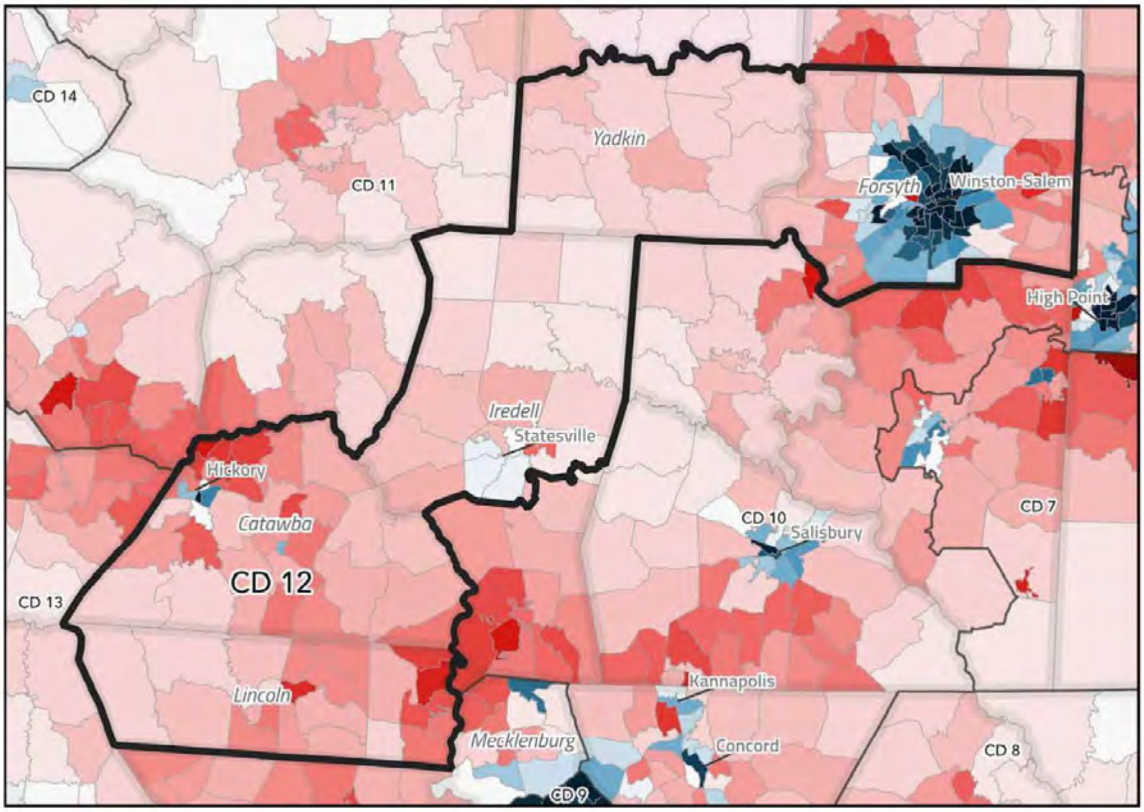


NC-12

The 12th congressional district stretches from Lincoln County at the southwestern corner through Catawba, the Northern part of Iredell, Yadkin, and Forsyth Counties. As the map below makes clear, by including Winston-Salem with this overwhelmingly red swath of geography and walling it off from Democratic voters in High Point, the enacted map ensures that Republican member of Congress Patrick McHenry, who lives at the southeast corner of this district, will maintain his seat and the Democratic voters in Winston-Salem will have virtually no chance to elect a member of their own party.

The Cook Political Report rates this district as R+9, Republicans had over a 100,000 vote margin in the two closest Council of State races, and Donald Trump won over 56% of the vote in this district.

Map 15: VTD CCSC estimates for NC-12



NC-13

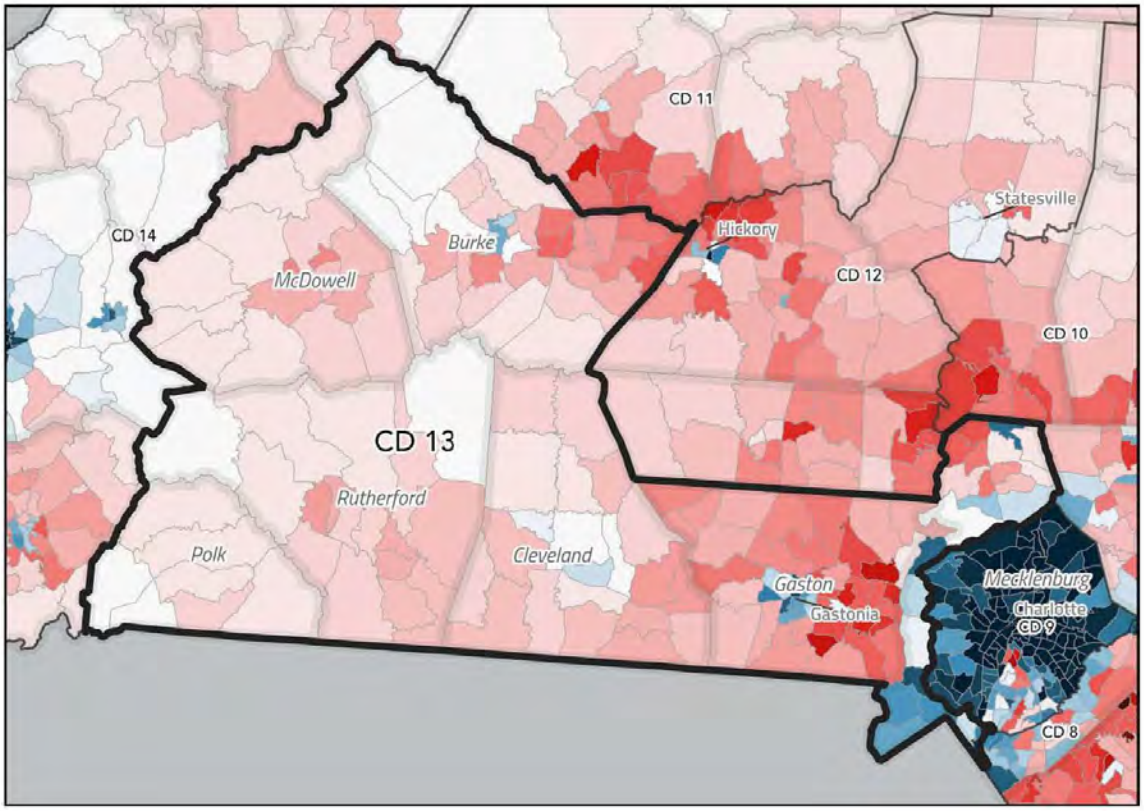
The 13th congressional district is carved out of portions of the old 11th, 5th, and 12th, and 10th districts. As the map that follows demonstrates, the district includes Polk, Rutherford, McDowell, Burke, Cleveland, Gaston, and part of Mecklenburg County.

The district was generally understood to be created for Republican Speaker of the House Tim Moore who lives in Cleveland County—the *Charlotte Observer*'s editorial board even referred to it as "Moore's designer district."[6] Republican Madison Cawthorn recently announced that he will run in the 13th, and Moore soon noted that he would stay in the General Assembly. While the specifics of the candidates have changed, the fact that this is a Republican district that will elected a Republican candidate has not. This district was rated by the Cook Political Report as R+13, has a CCSC of R+150,187 votes, and gave 60% of its votes to Donald Trump in 2020.

As mentioned in the discussion of NC-9, the narrow passageway that is necessary to squeeze NC-13 into Mecklenburg County only consists of a few miles at one point--stretching from a Food Lion to the Mecklenburg County line. The enacted district also creates unusual pairings of counties that share little in common. For example, Polk and Mecklenburg Counties have never resided in the same district.

[6] https://www.charlotteobserver.com/opinion/article255769626.html

Map 16. VTD CCSC estimates for NC-13

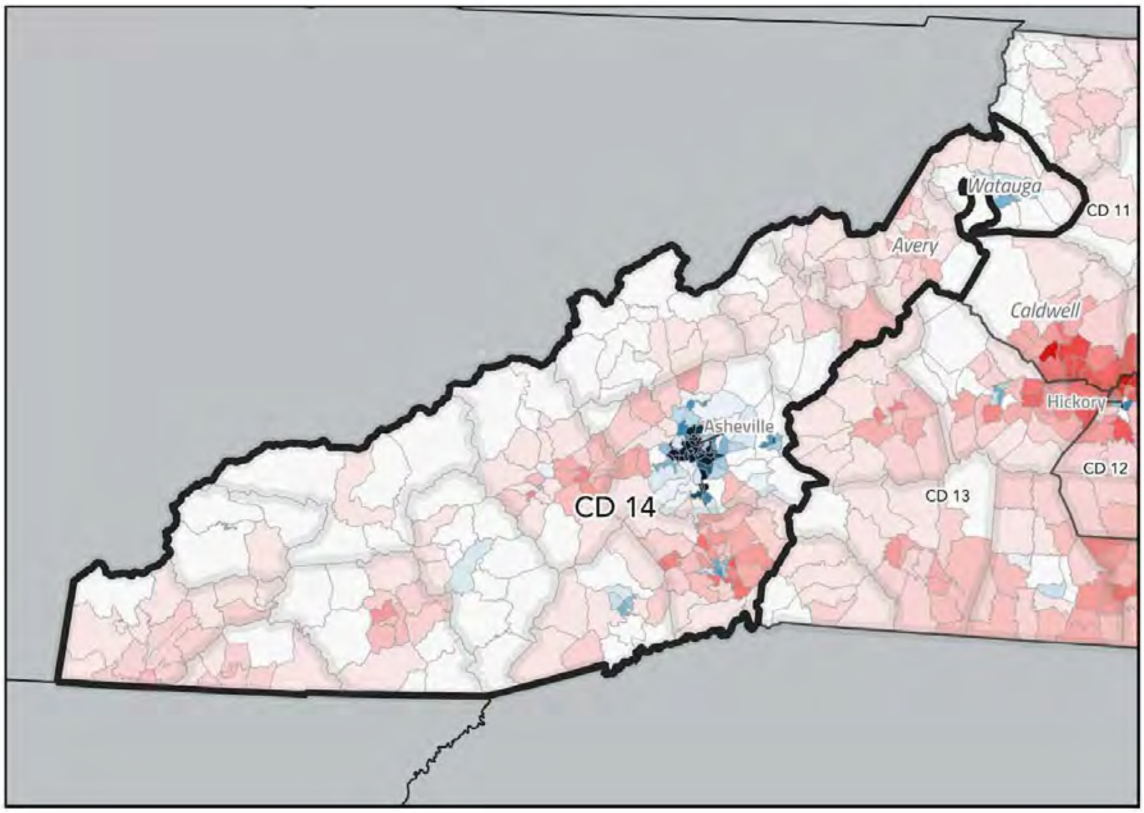


NC-14

The enacted 14th district includes most of the 11th congressional district and includes part of Watauga County, which previously sat in the 5th congressional district. The former 11th congressional district also lost the Republican strongholds of Polk and McDowell counties, as well as part of Rutherford County. These changes shifted the district slightly in the Democratic direction (from a PVI of R+9 to R+7), although not enough to give a Democratic candidate a reasonable chance of victory. No Democrat in Congress represents a district that has a PVI score that leans this heavily towards the Republican Party. As a result, the 14th is expected to stay squarely in Republican hands.

Geographically, the 14th is a sprawling district that includes three media markets. Traversing the district from its western end in Murphy to its northeastern corner in Stony Fork would take approximately four hours. Perhaps because of the geographic incompatibility, Watauga has not been in a district with the western end of the state since 1871—before Graham and Swain Counties were even in existence. Adequately representing this massive swath of geography would be difficult for any member of Congress—Republican or Democrat.

Map 17. VTD CCSC estimates for NC-14



Conclusion

After analyzing the characteristics of the map as a whole as well as the characteristics of each district in isolation, it is clear that the enacted map will increase the number of Republican members of Congress and decrease the number of Democratic members of Congress in North Carolina's congressional delegation. Democratic voters in the vast majority of the districts will have no chance at representation from a member of their own party and Republican voters in the districts that pack Democrats will have no chance of representation from a member of their own party. This is not a result of natural packing, or geographic clustering, but rather because the congressional district lines shifted in ways that, taken together, benefit the Republican Party. Not only does the enacted map create a substantial partisan advantage for which there is no apparent explanation other than gerrymandering, but it unnecessarily splits communities of interest and will alters representational linkages in ways that, in some cases, have never been seen in North Carolina's history.

Christopher A. Cooper

Expert Report on North Carolina's Enacted Congressional and General Assembly Districts

Christopher A. Cooper

December 23, 2021

NCLCV v. Hall
21 CVS 15426
LDTX174

Exhibit #
Cooper 2
JH-12/30/2021
exhibitsticker.com

Introduction

My name is Christopher A. Cooper. I have been asked to provide an analysis of the partisan characteristics of North Carolina's congressional and General Assembly maps, enacted on November 4, 2021. I am conducting this analysis as a private citizen and am not speaking for my employer, nor am I conducting this work on university time, or using university resources.

I am the Robert Lee Madison Distinguished Professor of Political Science and Public Affairs at Western Carolina University, where I have been a tenured or tenure-track professor since 2002. I hold a PhD and MA in Political Science from the University of Tennessee, Knoxville and a BA in Political Science and Sociology from Winthrop University. My academic research focuses on state politics and policy, elections, and southern politics—with particular application to North Carolina. To date, I have published over 50 academic journal articles and book chapters, co-edited one book focused on North Carolina (*The New Politics of The Old North State*), and co-authored one book related to politics in the South, including North Carolina (both books with the University of North Carolina Press). I teach courses on state and local politics, political parties, campaigns, and elections, southern politics, research methods, and election administration. In 2013, I was named the North Carolina Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and I have received Western Carolina University's highest honors in teaching (Board of Governors Teaching Award), and scholarship (University Scholar). My current curriculum vitae is attached as Attachment A.

Much of my academic and applied research relates to North Carolina politics and policy and I am a frequent source for news media seeking comments about politics in the Old North State. My quotes have appeared in national and international outlets including *The New York Times*, *The Washington Post*, Politico, BBC, NPR's *All Things Considered*, and *The New Yorker*, as well as in North Carolina-based outlets including *The News and Observer*, *The Charlotte Observer*, *Asheville-Citizen Times*, *Carolina Journal*, *Spectrum News*, and NPR affiliates in Chapel Hill, Charlotte, and Asheville. I have written over 100 op-eds on North Carolina, southern and national elections and politics, including pieces in *The Atlanta Journal-Constitution*, NBC.com, *The News and Observer*, *The Charlotte Observer*, and *Asheville Citizen-Times*, and I regularly give talks about North Carolina politics, North Carolina elections, and the redistricting process to groups throughout the state. I previously served as an expert witness in *Common Cause v. Lewis*, 18-CVS-014001 (N.C. Super. Ct. Sep. 3, 2019).

I am being compensated at a rate of $300 per hour.

North Carolina is a state defined by competitive two-party politics in terms of its citizens and in its elections for statewide elective offices. Its congressional and state legislative delegations, by contrast, have defied this evidence of competitiveness and moderation and have leaned heavily towards the party in control of the General Assembly, despite the fact that Democrats and Republicans garner similar numbers of statewide votes.

This difference cannot be explained away as a result of where Democrats and Republicans happen to live. As Stanford political geographer Jonathan Rodden demonstrated, North Carolina does not show as much evidence of "natural clustering" as other states. "Due to the presence of a sprawling knowledge-economy corridor, a series of smaller automobile cities with relative low partisan gradients, and the distribution of rural African Americans, Democrats are relatively efficiently distributed in North Carolina at the scale of congressional districts."[1] Looking across all 50 states, Political Scientists Alex Keena, Michael Latner, Anthony J. McGann, and Charles Anthony Smith come to a similar conclusion at the state legislative level: "It is clear that geographical considerations such as the urban concentration of Democrats cannot explain away partisan gerrymandering. There is strong evidence that it is indeed possible to draw unbiased (or almost unbiased) districting plans, even in states with large and densely clustered city dwellers."[2]

As I demonstrate in the analysis that follows, the available evidence indicates that this gap in representation is due to partisan gerrymandering, drawing lines to benefit one party at the expense of the other. While a small deviation from established political patterns is not necessarily evidence of gerrymandering, the differences observed in North Carolina's political outcomes are large and sustained.

Gerrymandering is generally accepted as a threat to democracy in North Carolina and across the nation. This statement is true regardless of partisanship. For example, a 2018 Elon Poll found that just 10% of registered voters in North Carolina believe the current redistricting system is "mostly fair."[3] A more recent poll found that 72% of North Carolinians believe gerrymandering is "a very serious problem" or "a somewhat serious problem" while only 6% believe it is "not a problem." The same poll (which, it should be noted, includes question wording that references both Democratic and Republican gerrymandering) found that 74% of North Carolinians "support efforts by the courts to ensure maps are fair and constitutional."[4] Yet another recent poll found that 89% of North Carolina voters "oppose drawing voting districts to help one political party or certain politicians win an election."[5] A recent op-ed in *The News and Observer* by Republican Carter Wrenn and Democrat Gary Pearce illustrates bi-partisan agreement on the evils of gerrymandering in clear terms. They explain, "We agree that gerrymandering is a major problem that undermines the foundations of our democracy. We agree that districts shouldn't be drawn to help one political party,

---

[1] Rodden, Jonathan, *Why Cities Lose* (New York: Basic Books, 2019), 173.

[2] Keena, Alex, Michael Latner Anthony J. McGann, and Charles Anthony Smith, *Gerrymandering in the States: Partisanship, Race and the Transformation of American Federalism* (New York: Cambridge University Press, 2021), 86.

[3] Elon Poll, "The State of Political Knowledge in North Carolina," February 12-15, 2018, *available at* https://www.elon.edu/u/elon-poll/wp-content/uploads/sites/819/2019/02/Elon-Poll-Report-022318.pdf.

[4] Public Policy Polling, "North Carolina Survey Results," December 6-7, 2021, *available at* https://progressncaction.org/wp-content/uploads/2021/12/NorthCarolinaResults.pdf.

[5] RepresentUs, "North Carolina Polling: Voters See Gerrymandering as a Major Problem, Want Reform," August 9, 2021, *available at* https://represent.us/wp-content/uploads/2021/08/Rep-US-Polling-Memo-North-Carolina-0821.pdf.

no more than college basketball games should be rigged to favor one team."[6] The preference for fair maps—those not gerrymandered to achieve a partisan advantage—is not a partisan one.

Summary of Key Findings

- North Carolina is, by virtually any measure, a "purple state" with healthy two-party competition at the statewide level. The North Carolina Governor is a Democrat, while the U.S. Senators are Republicans. There are more registered Democrats than Republicans in the state, and in the 2020 election, the two-party vote share difference between Donald Trump and Joe Biden was the smallest of any state that Trump won.

- North Carolina has a history of gerrymandering for partisan gain.[7] North Carolina's maps since 2011, in particular, have demonstrated clear partisan bias[8] that has implications for democracy. Immediately after the 2011 redistricting cycle, North Carolina's democracy weakened considerably, according to one scholar, moving from a democracy score that placed the Old North State roughly in the middle of the pack to one near the bottom of the country.[9]

- As a result of the 2020 census, North Carolina earned an additional congressional seat because of population growth that occurred mostly in urban areas, which tend to favor Democrats: according to an analysis of U.S. census data by *The News and Observer*, more than 78% of North Carolina's population growth over the last decade came from the Triangle area and the Charlotte metro area.[10] Despite that fact, the number of anticipated Democratic seats actually *decreases* in the current congressional map, as compared to the last map enacted in late 2019 and used in the 2020 elections. The last map produced 5 Democratic wins and 8 Republican wins; this map is expected to produce 3 Democratic wins, 10 Republican wins and 1 competitive seat.

- In the congressional map, Democratic strongholds Mecklenburg, Guilford, and Wake counties are each divided across three districts, despite the fact that there is no population-based reason to divide them this many times. In the previous congressional map, Mecklenburg was divided into two districts, Wake into two districts, and Guilford fell completely in one district. The strategic splits in the enacted map ensure that large numbers of voters will have no chance of being represented by a member of their own party. These splits will also lead to voter confusion and fractured representational linkages.

---

[6] Gary Pearce and Carter Wrenn, "We're usually on opposite sides of political battles. But we agree on NC voting maps." *The News and Observer*, October 21, 2021, available at https://www.newsobserver.com/opinion/article255145572.html.
[7] Bitzer, J. Michael, *Redistricting and Gerrymandering in North Carolina: Battlelines in the Tar Heel State* (Palgrave Macmillan, 2021).
[8] *See, e.g.*, Keena, Alex, Michael Latner Anthony J. McGann, and Charles Anthony Smith, *Gerrymandering in the States: Partisanship, Race and the Transformation of American Federalism* (New York: Cambridge University Press, 2021), 86.
[9] Grumbach, Jacob M. "Laboratories of Democratic Backsliding." (Unpublished Manuscript: University of Washington, 2021), *available at* https://sites.google.com/view/jakegrumbach/working-papers. Insights from this manuscript are forthcoming in *Laboratories Against Democracy*, Princeton University Press (https://press.princeton.edu/books/hardcover/9780691218458/laboratories-against-democracy).
[10] David Raynor, Tyler Dukes, and Gavin Off, "From population to diversity, see for yourself how NC changed over 10 years." *The News and Observer*, October 18, 2021, *available at* https://www.newsobserver.com/news/local/article253546964.html.

- The enacted congressional map produces geographic contortions that combine counties in ways that, in some circumstances, have never existed before.

- The double-bunking that occurs in the enacted congressional map advantages the Republican Party. A Republican (Virginia Foxx) and a Democrat (Kathy Manning) are both drawn into in an overwhelmingly Republican district (congressional district 11), thus virtually guaranteeing that the Democrat (Manning) will lose her seat. There are no cases where two Republican incumbents seeking re-election are double-bunked. The map also produces at least one district with no incumbents, but that district (congressional district 4) overwhelmingly favors the Republican Party.

- Despite the application of the *Stephenson v. Bartlett* county clustering rule, the mapmakers had considerable leeway in drawing the vast majority of North Carolina House and Senate districts. The enacted district lines "pack" Democratic leaning voters into a small number of districts, thus producing a few Democratic districts with large electoral margins. The district lines "crack" the remaining Democratic voters across the remaining districts, so that Democratic voters cannot comprise a majority of any of those districts. Conversely, the maps distribute Republican VTDs more efficiently, to translate those Republican votes into a greater number of anticipated seats. These practices ultimately result in large Republican seat advantages in the General Assembly—advantages that far outweigh the Republicans' share of the aggregate vote between the two parties. These maps are likely to lead to a General Assembly that will not represent the will of the people of the state.

- Neutral, third-party observers have been uniform in their negative assessment of the enacted maps. For example, The Princeton Gerrymandering Project assessed a grade of "F" in partisan fairness and "C" in competitiveness for all three maps. Dave's Redistricting App (DRA) assesses the congressional map as "very bad" in proportionality and "bad" in terms of competitiveness. While the House and Senate maps fare slightly better in terms of proportionality according to DRA, DRA assesses both maps to be "bad" in terms of competitiveness. Both The Princeton Gerrymandering Project and DRA are nonpartisan and have given similar grades to Democratic gerrymanders in other states.

North Carolina's Partisan Competitiveness

North Carolina has long been known for political moderation and competitive two-party politics. In 1960, Political Scientist V.O. Key noted North Carolina's distinctiveness from the rest of the South, owing to its comparatively competitive two-party politics.[11] North Carolina journalist Rob Christensen and Wake Forest University Political Scientist Jack Fleer noted more recently that the state enjoys "two strong and competitive parties."[12] Work by contemporary observers reinforces the notion that North Carolina is a competitive two-party state where statewide offices are winnable for either major political party.[13]

Two-Party Competition in Election Results

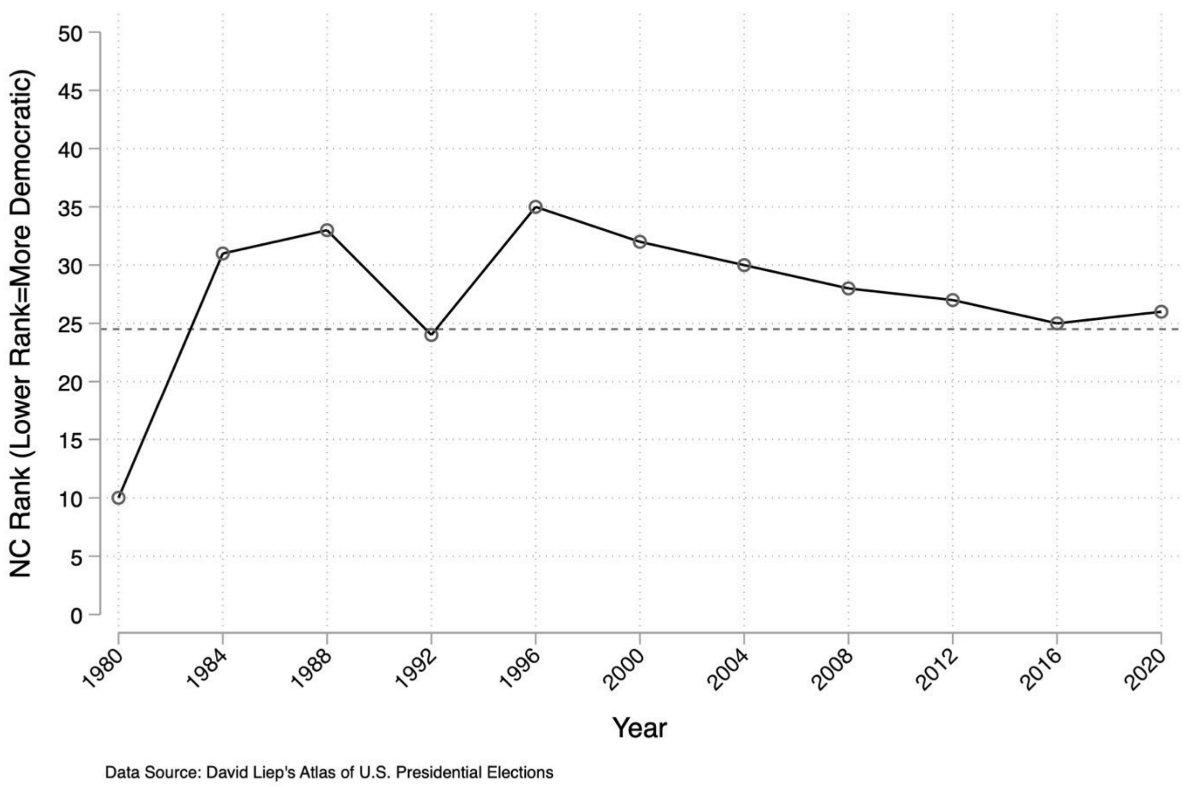
As I have written previously, one way to gauge the state's relative moderation and two-party competitiveness is simply to look at electoral results from races where gerrymandering is not possible—races where people are elected at the state level, rather than by districts that are subject to gerrymandering. The most prominent example of such an election, of course, is the U.S. presidential election.

The figure below plots North Carolina's presidential election results as ranked alongside those from other states, ranging from the state where the Democratic candidate received the largest vote share (1) to the state where the Democratic candidate receive the smallest vote share (50). Here, we see that North Carolina is best described as a competitive two-party state that sits roughly in the middle of the country in terms of partisan voting patterns. In 2000, North Carolina had the 32nd highest vote share for the Democratic candidate for president. In 2004, Democratic presidential candidate John Kerry received his 30th highest vote share in North Carolina. In 2008, then-presidential candidate Barack Obama's vote share in North Carlina was 28th highest in the country. In 2012, incumbent President Obama's vote share in North Carolina was 27th highest in the country. In 2016, North Carolina had the 26th highest Democratic vote share in the country and in 2020, it was the 27th highest.

---

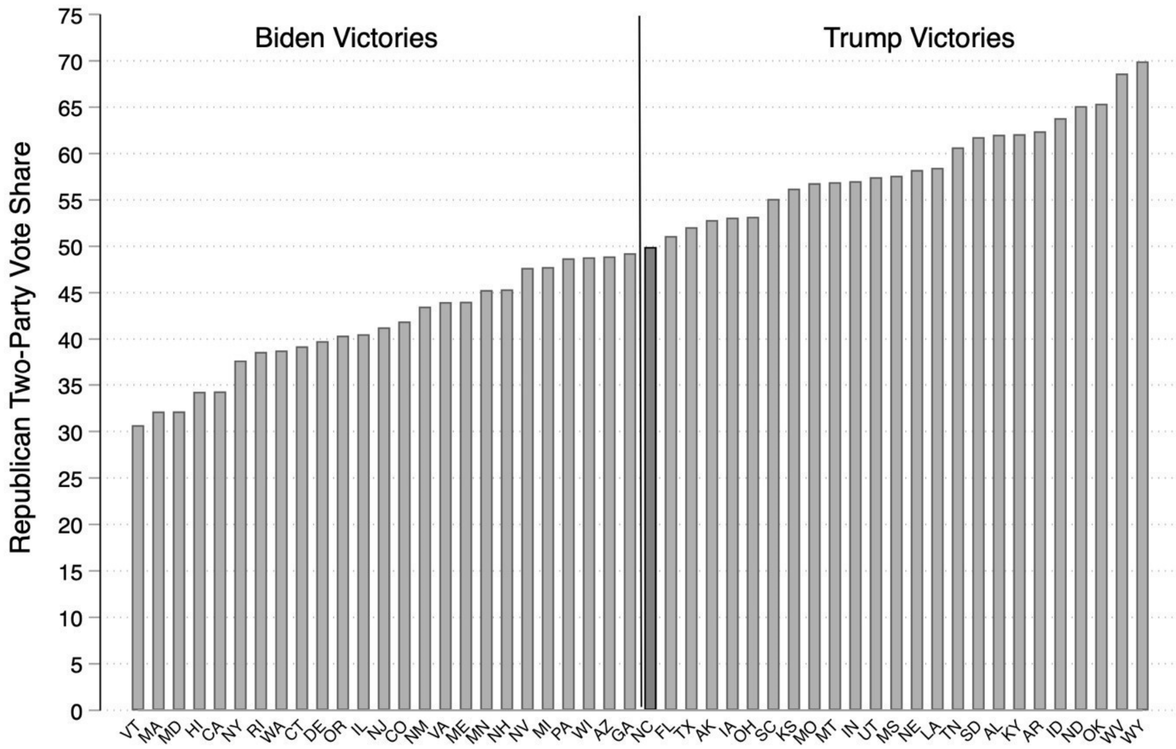
[11] *See* Key, V.O., Jr., *Southern Politics in State and Nation* (Knoxville: University of Tennessee Press, 1960).
[12] Christensen, Rob, and Jack D. Fleer, "North Carolina: Between Helms and Hunt No Majority Emerges," in Alexander P. Lamis, ed. *Southern Politics in the 1990s* (Baton Rouge: Louisiana State University Press, 1999), 106.
[13] Bitzer, J. Michael, and Charles Prysby, "North Carolina," in Charles S. Bullock III, and Mark J. Rozell, eds., *The New Politics of the Old South*, 7th Edition (Rowman and Littlefield, 2021).

Figure 1. North Carolina Rank in Democratic Vote Share for President Among the 50 States



In the 2020 election, North Carolina was perched on the razor's edge between Republican and Democrat—Donald Trump's two-party vote share was the smallest in North Carolina of any state he won in 2020. If any state can be described as "purple" or "competitive" in modern American politics, it is North Carolina.

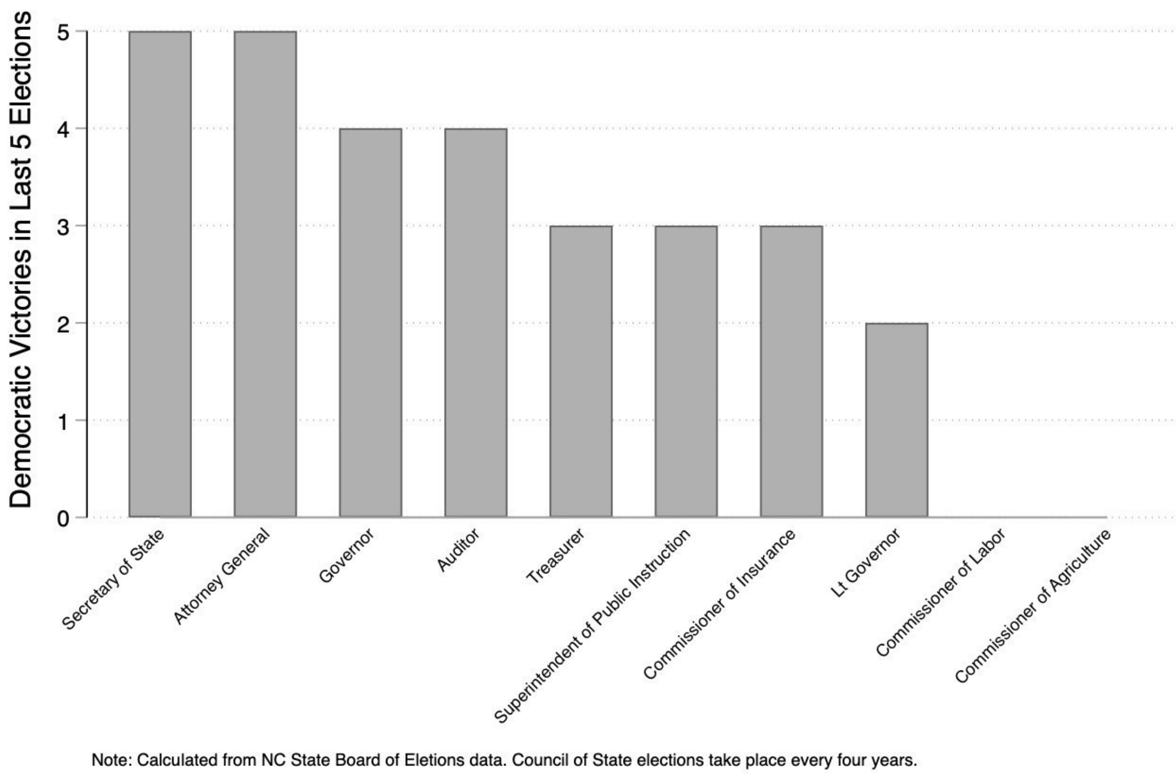
Figure 2. Two-Party Vote Share in the 2020 Presidential Election



Another way to understand North Carolina's competitiveness is to examine election results at the Council of State—ten members of the Executive branch who vary in prominence but are all elected in partisan quadrennial elections. These include the Governor, Lieutenant Governor, Secretary of State, State Auditor, State Treasurer, Superintendent of Public Instruction, Attorney General, Commissioner of Agriculture, Commissioner of Labor, and Commissioner of Insurance.

The result of these elections over the past five election cycles demonstrates once again that North Carolina enjoys significant partisan competition. Democrats have won 29 out of 50 Council of State elections since 2004.

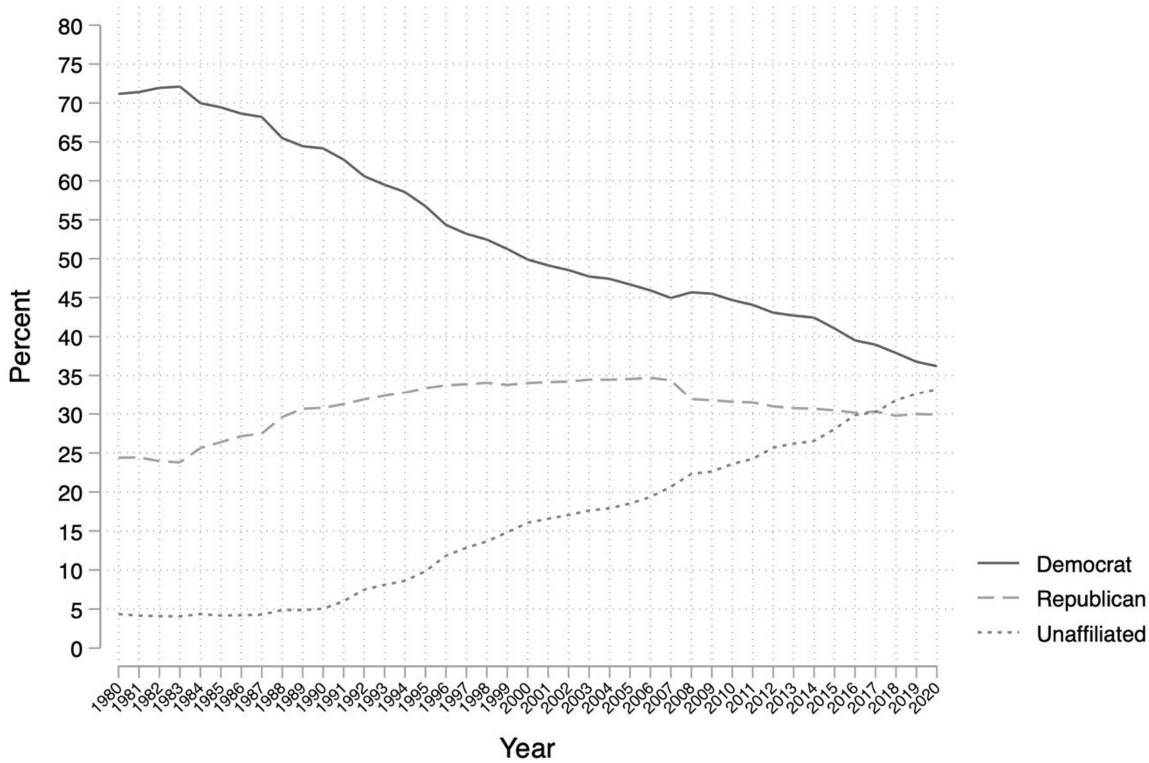
Figure 3. Results of The Last Five Council of State Elections



Two-Party Competition and Moderation in the Electorate

North Carolina has considerable two-party competition in terms of voter registration. As the figure below indicates, Republican Party identification has never exceeded Democratic Party identification in the history of the state. While this is certainly not a sign of a liberal, Democratic state, it is similarly belies any contention that North Carolina is a conservative, Republican state.

Figure 4. Voter Registration in North Carolina



Partisan identification is, of course, just one indicator of the political lean of a state's citizens. And, given the rise in Unaffiliated voters in North Carolina, it is an increasingly noisy indicator.[14] Existing measures of statewide public opinion, however, come to the same conclusion: North Carolina does not lean heavily towards one party or ideology. One measure of state-level public opinion finds that North Carolina falls near the middle of the distribution of state-level political ideology as the 24th most liberal state in the country.[15] Another widely accepted measure finds that North Carolina is the 25th most liberal state in the country.[16]

Legislative Votes and Seats in the Aggregate

Historically, North Carolina's legislative delegation has not reflected these patterns of two-party competition and moderation. As the following three graphs demonstrate, North Carolinians consistently give about half of their two-party vote share to each party, yet the Republicans dominate in terms of legislative representation. This suggests that the representational linkage between voters and North Carolina's legislative representatives is weaker than between the voters and various other elected offices.

---

[14] Although using partisan identification as an indicator of voter preference can be problematic given that people generally change their voting pattern before changing partisan identification, North Carolina's party registration data is consistent with its moderate statewide voting patterns, as illustrated by the other measures included in this report.

[15] Berry, William D., Evan J. Ringquist, Richard C. Fording, and Russell L. Hanson, "Measuring Citizen and Government Ideology in the American States, 1960-93." *American Journal of Political Science* 42(1998): 327-48. Raw data are available at https://rcfording.com/state-ideology-data/.

[16] Tausanovitch, Chris, and Christopher Warshaw, "Measuring Constituent Policy Preference in Congress, State Legislatures, and Cities." *The Journal of Politics* 75(2013): 330-342. *See* http://www.americanideologyproject.com for data.

Figure 5. Comparing Votes and Seats in North Carolina's Congressional Delegation, 2012-2020

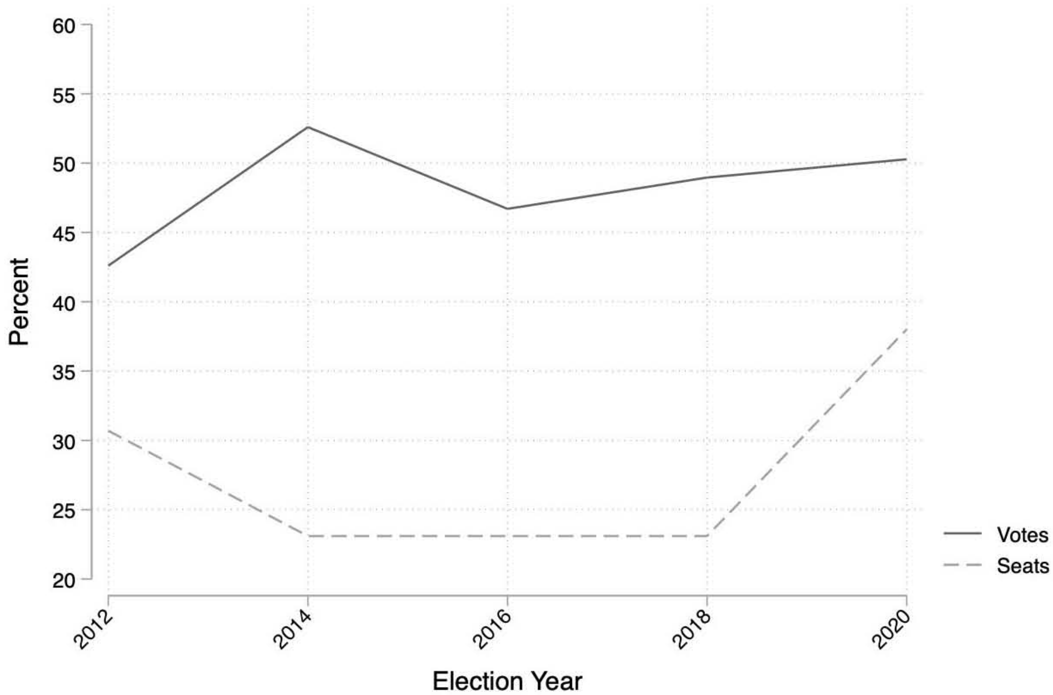


Figure 6. Comparing Votes and Seats in the North Carolina Senate, 2012-2020

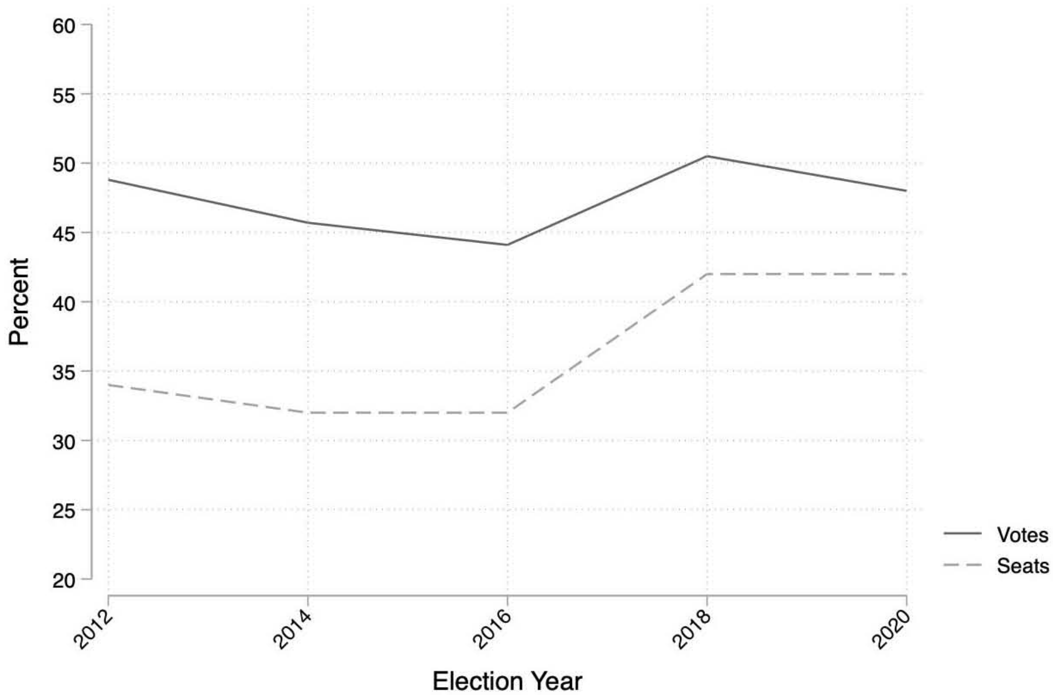
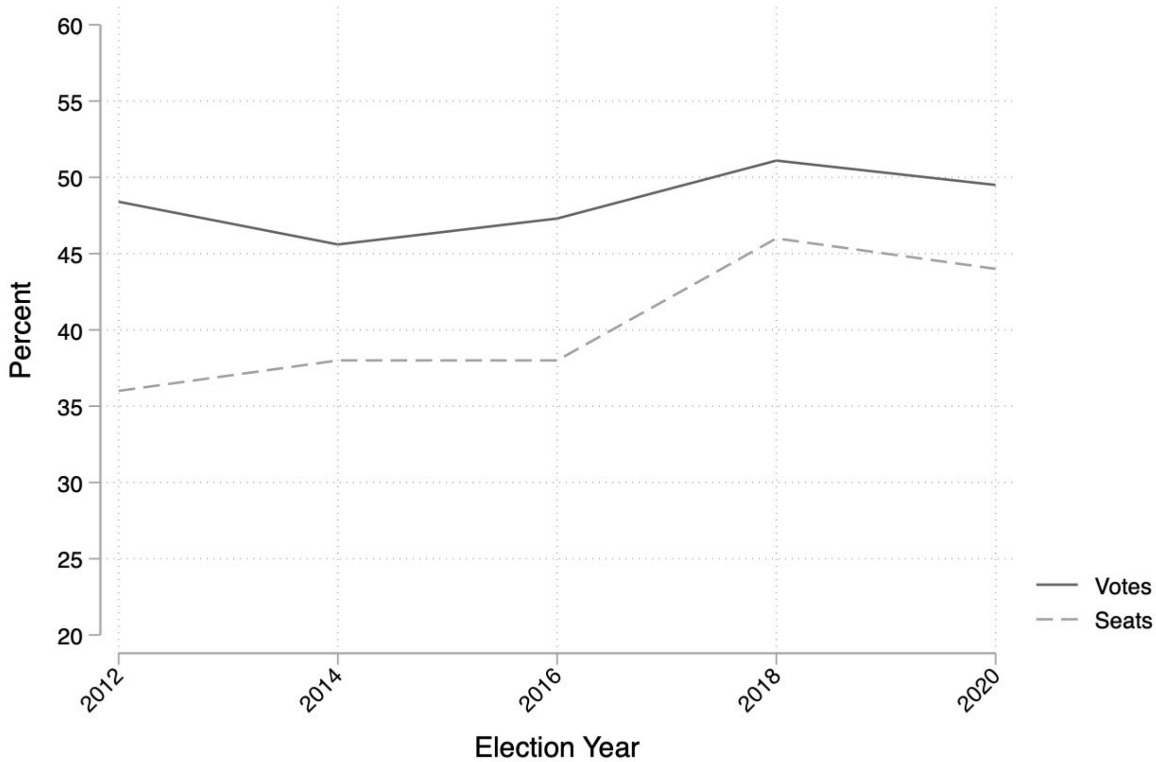


Figure 7. Comparing Votes and Seats in the North Carolina House, 2012-2020

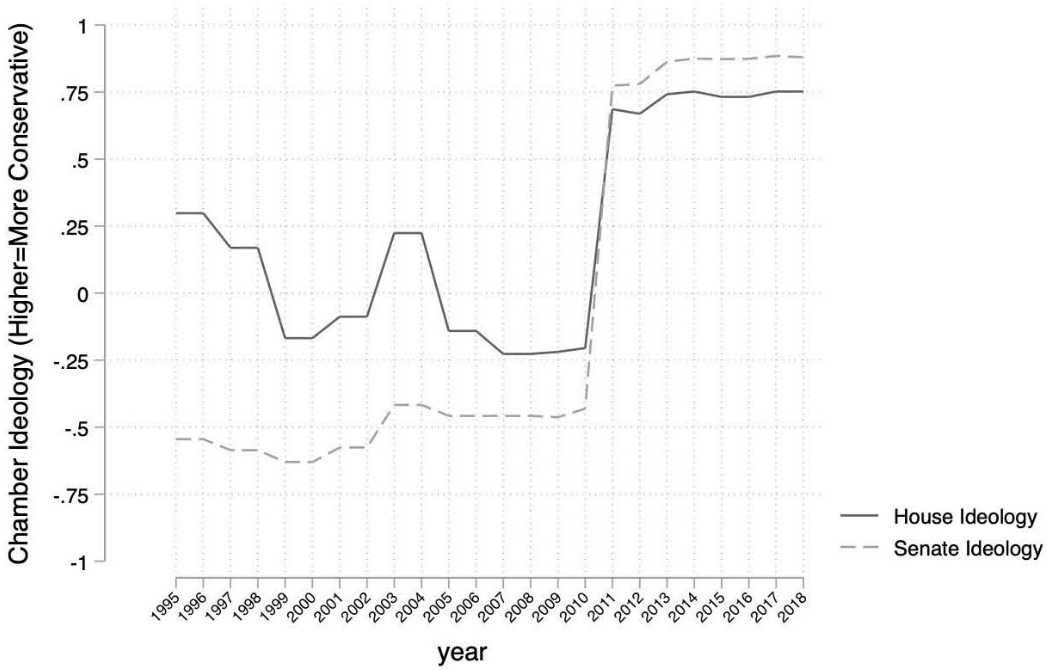


Policy Outcomes

While North Carolina's statewide electoral outcomes, public opinion estimates, and party registration data all suggest a state that falls near the middle of the ideological and partisan spectrum in terms of citizen policy preferences, the partisanship of North Carolina's congressional and General Assembly delegations run counter to these measures. Further, available evidence suggests that the policy behavior and ideology of state legislators and members of Congress in North Carolina are at odds with statewide measures of two-party competition and ideological moderation. Estimates of voting patterns at the General Assembly[17] and congressional[18] levels reinforce that both delegations have moved in an increasingly conservative direction, while the aggregate public opinion of the citizenry has remained relatively constant. *See* figures 8 and 9 below.

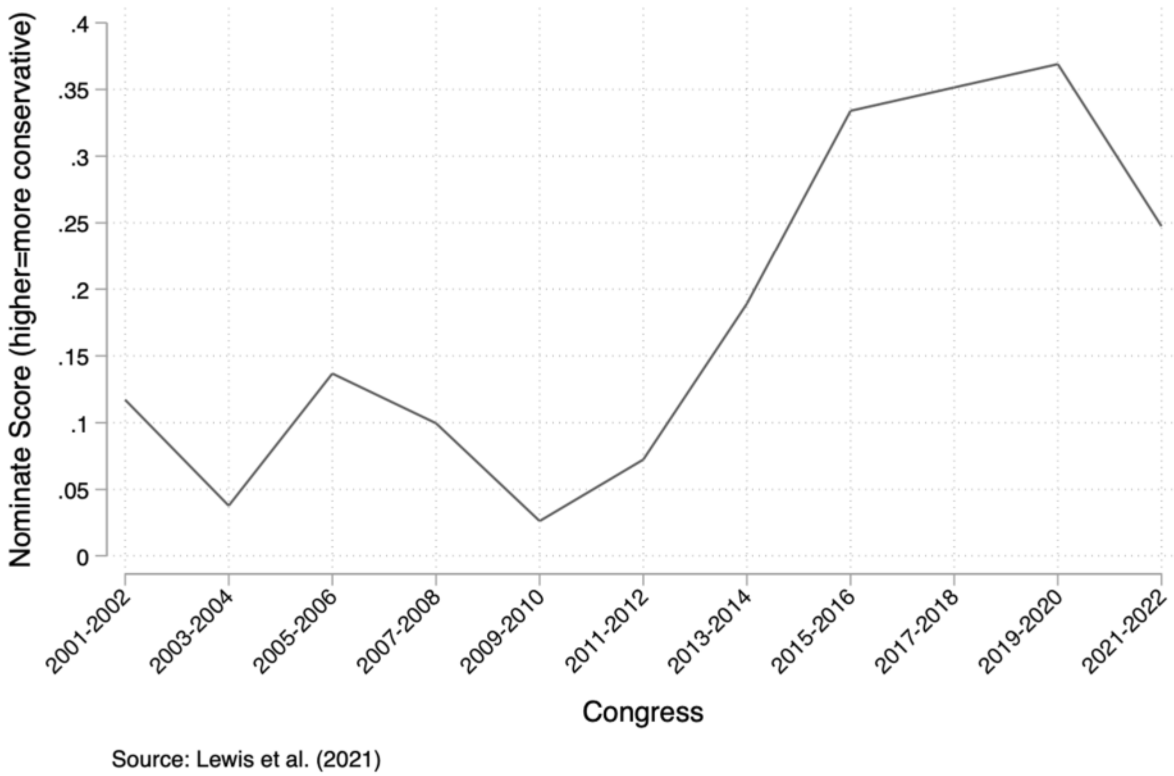
[17] Data are from Schor, Boris, and Nolan McCarty. 2020. American Legislatures Project, *available at* https://americanlegislatures.com.
[18] Lewis, Jeffrey B., Keith Poole, Howard Rosenthal, Adam Boche, Aaron Rudkin, and Luke Sonnet (2021). *Voteview: Congressional Roll-Call Votes Database*. https://voteview.com/.

Figure 8. Chamber Estimates of North Carolina General Assembly Ideology, 1995-2018



Source: American Legislatures Project (Schor and McCarty 2020)

Figure 9. Nominate scores of North Carolina's congressional delegation, 2001-2002 Congress through 2021-2022 Congress



In a forthcoming book, Political Scientist Jacob Grumbach finds that North Carolina experienced significant democratic backsliding in recent years—"among the most democratic states in the year 2000, but by 2018, they are close to the bottom."[19] It is important to note that Grumbach's measure is one of "small d" democratic backsliding—he does not measure partisanship, but rather a state's propensity to adhere to basic norms of democracy.

Taken together, these complementary measures of North Carolina voters' behaviors, ideological preferences, and partisanship indicate that North Carolina is a politically moderate state that enjoys two-party competition for the vast majority of elected offices. Beginning in 2011, however, North Carolina's congressional and General Assembly delegations have run counter to this trend, both in terms of partisanship and expressed policy preferences.

[19] Grumbach, Jacob M., "Laboratories of Democratic Backsliding," (Unpublished Manuscript: University of Washington, 2021), *available at* https://sites.google.com/view/jakegrumbach/working-papers. *See* a graph focusing on North Carolina's democratic backsliding on pg. 13. Insights from this manuscript are forthcoming in *Laboratories Against Democracy*, Princeton University Press (https://press.princeton.edu/books/hardcover/9780691218458/laboratories-against-democracy).

District Analysis

The remainder of this report is devoted to examinations of specific districts (in the case of Congress) and county "clusters" (in the case of the General Assembly). In the text that follows, I refer to the "current" maps as the maps that were used in the 2020 election and the "enacted" maps as the maps that have been approved by the North Carolina General Assembly for use in the 2022 elections. While I conducted all of the analysis that follows and wrote all of the verbiage, the shaded red-and-blue maps were produced by John Holden, a geographic information system (GIS) expert, using a "CCSC" measure of partisanship that I selected and describe below. Mr. Holden also produced the other maps in the following pages that show the effect of the district lines on certain municipalities.

I use a few different metrics in the analysis that follows. The first is the Cook Political Report's Partisan Voter Index (PVI), a standard metric of the expected "lean" of a congressional district using a composite of past elections. The second is the Civitas Political Index (CPI), a measure of partisan district lean for state legislative districts derived from prior Council of State votes. The CPI places each district on a scale from D+1 (a district that has a slight Democratic tilt) to D+36 (a district with an overwhelming Democratic tilt), with mirrored results on the Republican side indicated with an "R" instead of a "D." The third is a metric created for this analysis that combines the results of the 2020 Secretary of Labor and Attorney General races, the two closest Council of State races in North Carolina that year, into one measure, which I term the Competitive Council of State Composite (CCSC).[20] This measure allows for the use of relatively low-profile elections to get a sense of the "true partisanship" of the district. It is presented below as the raw difference in votes and is used in the shaded red-and-blue maps that follow. From time to time, I mention the percent of the electorate that voted for Donald Trump in the 2020 election to give yet another sense of the partisan lean of the district, county, or cluster.

Congressional District Analysis

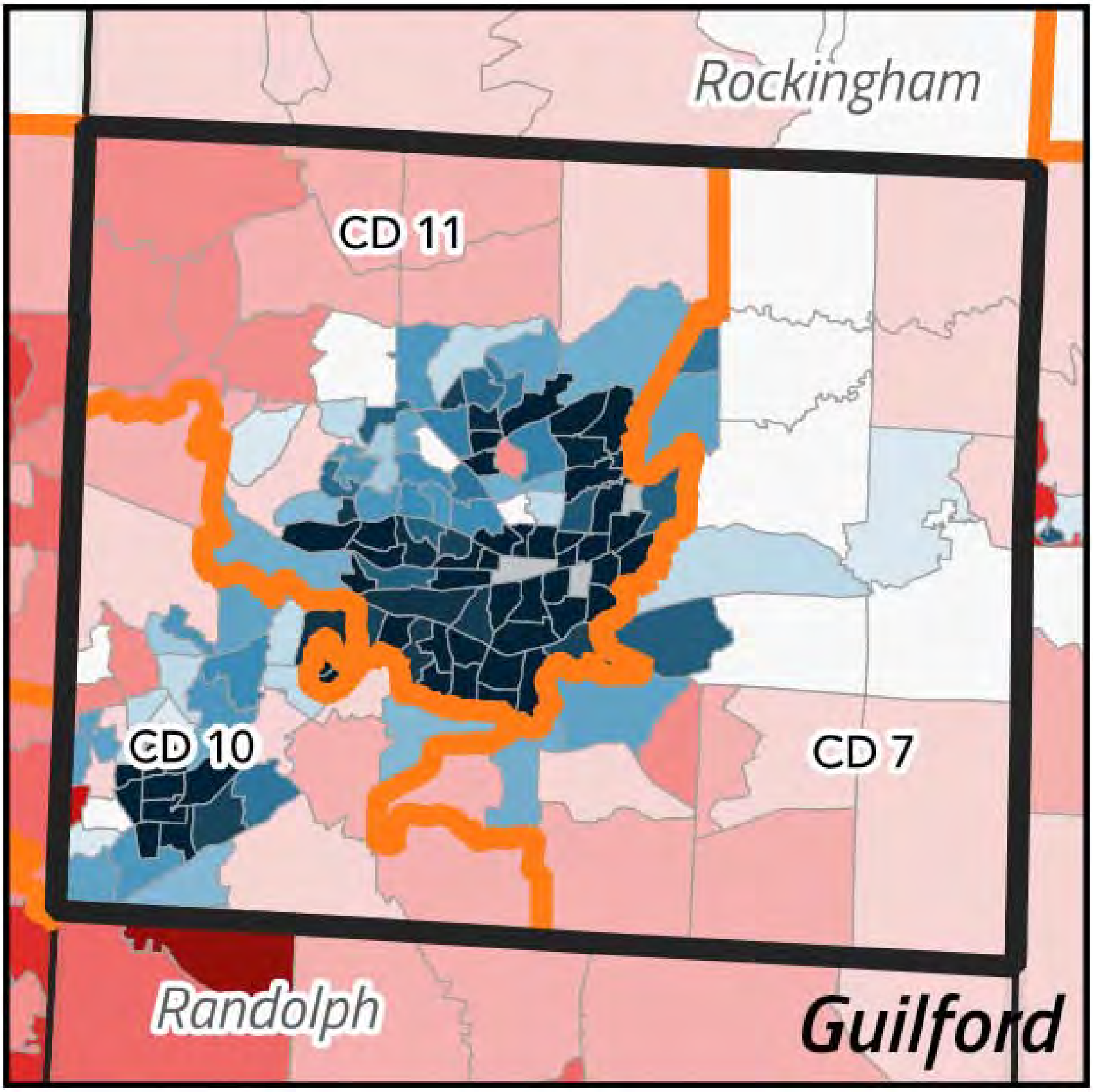
I begin by showing shaded red-and-blue maps demonstrating the trisection of Wake County, Mecklenburg County, and Guilford County by the congressional district lines (maps 1, 2, and 3 below). These maps show county lines in black, VTD lines in gray, and district lines in orange. The red-and-blue shading represents the relative vote margin using my CCSC—the composite results of the Secretary of Labor and Attorney General races in 2020—in each VTD, with darker blue shading representing larger Democratic vote margins and darker red shading indicating larger Republican vote margins (both normalized by acreage).

While district-by-district analysis is important, the congressional map is best understood as a single organism, rather than 14 separate entities—as one district moves in one direction, another must respond. This means that the unnecessary division of Mecklenburg, Guilford, and Wake counties across multiple congressional districts, achieved by the cracking and packing of Democratic voters in those counties, has ripple effects throughout the map. Map 4 shows the entirety of the congressional map with red-and-blue CCSC shading.

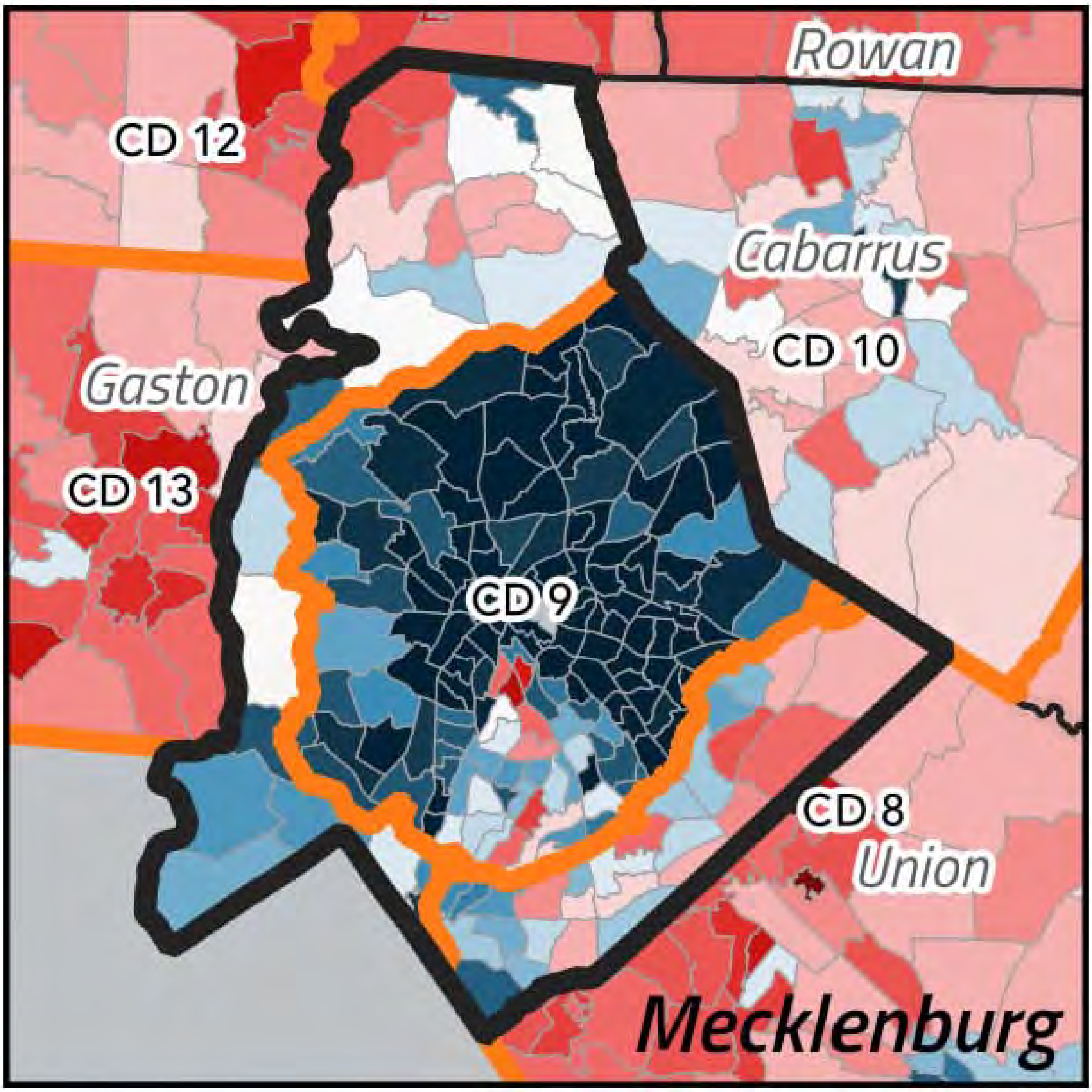
---

[20] The election data utilized for the CCSC metric, including to generate the red-and-blue shading on the maps that follow, was obtained from the North Carolina State Board of Elections website. *See* https://www.ncsbe.gov/results-data/election-results/historical-election-results-data.

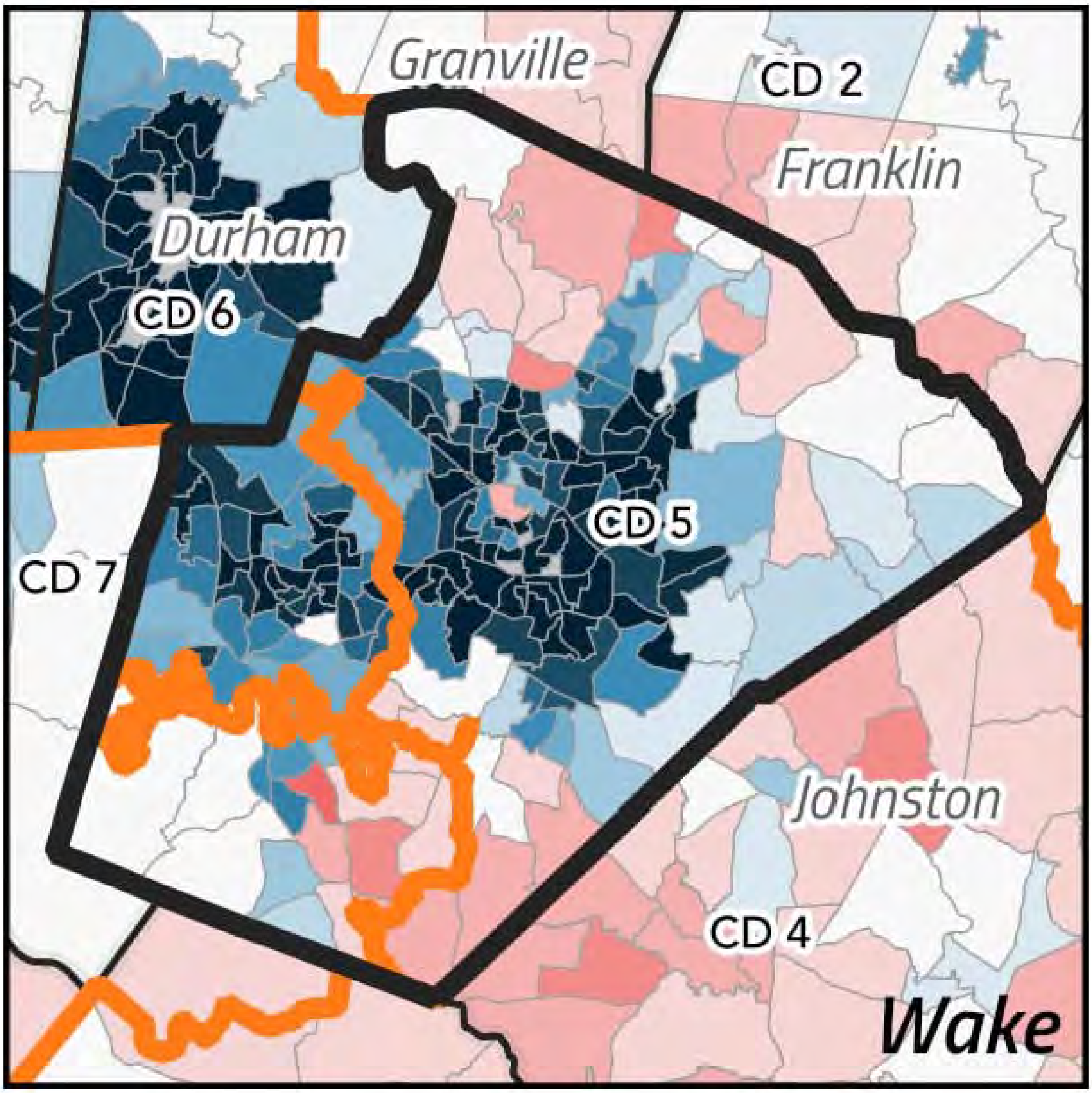
Map 1. Close-up of Guilford County VTD CCSC, split across three districts



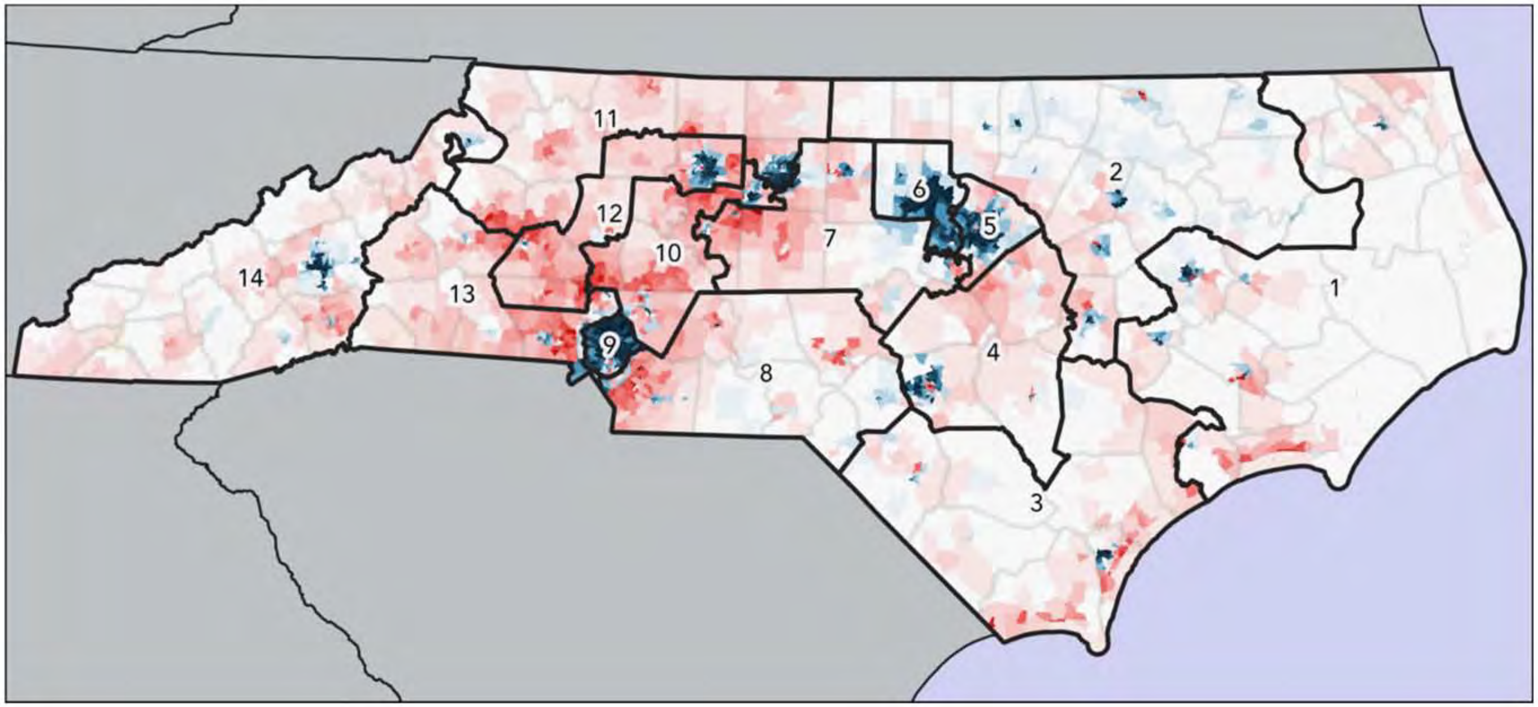
Map 2. Close-up of Mecklenburg County VTD CCSC, split across three districts



Map 3. Close-up of Wake County VTD CCSC, split across three districts



Map 4. Statewide overview of the enacted congressional map



As the table below shows, the PVI, CCSC, and Trump Percentage all tell a similar story: the enacted map will produce 10 Republican seats, 3 Democratic seats, and 1 competitive seat. At most, the enacted map could be expected to elect four Democrats to office in 2022—fewer than in the current map and far below what one would expect based on Democratic representation statewide or the results of other recent statewide elections.

Table 1. Summary Data for Each Enacted Congressional District

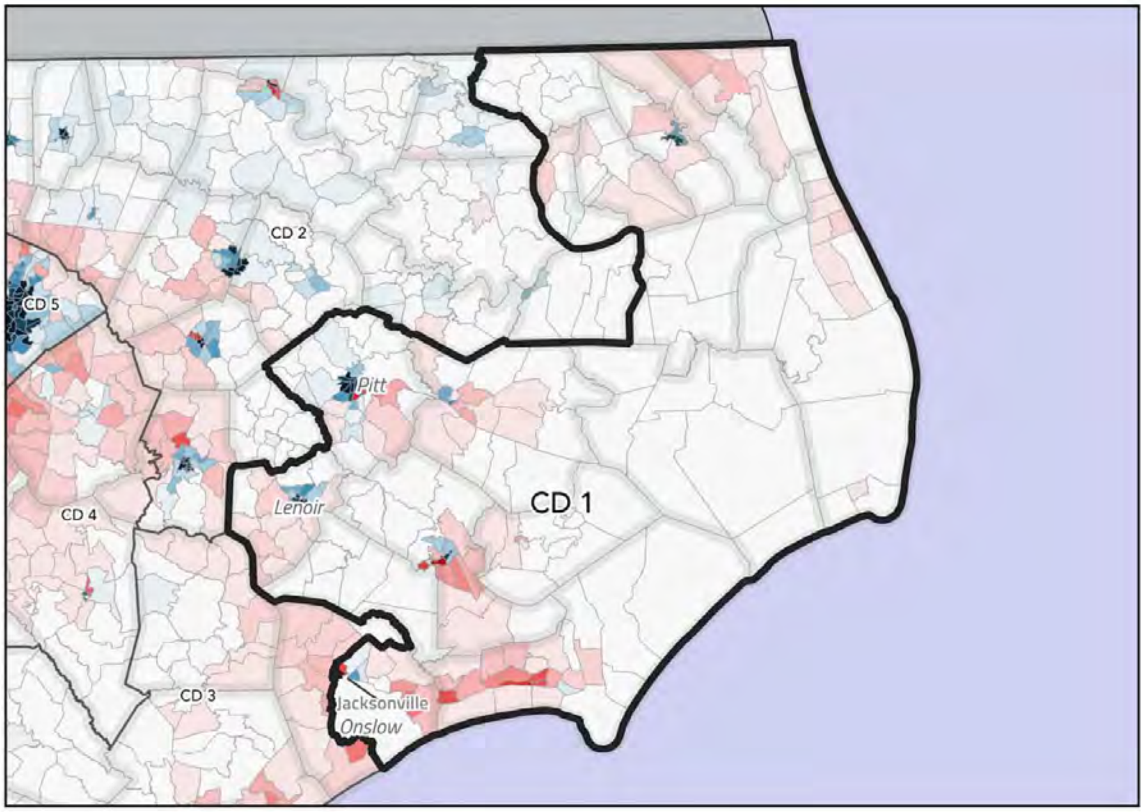
District	PVI	CCSC	Trump Perc
1	R+10	R +98,969	57%
2	Even	D +40,396	48%
3	R+10	R +111,451	58%
4	R+5	R +28,045	53%
5	D+12	D +227,327	34%
6	D+22	D +374,786	25%
7	R+11	R +115,682	57%
8	R+11	R +125,842	57%
9	D+23	D +325,717	25%
10	R+14	R +156,833	60%
11	R+9	R +94,407	57%
12	R+9	R +102,404	56%
13	R+13	R +150,187	60%
14	R+7	R +58,387	53%

NC-1

The enacted 1st congressional district is mostly comprised of the current NC-3, but also includes part of the current NC-1. Most potential congressional districts in this part of North Carolina would likely lean towards the Republican Party, but to create extra advantage for the Republican Party in other parts of the map, the current map brings the Democratic-leaning areas of Pitt County into NC-1, thus removing them from NC-2 and allowing NC-2 to become much more competitive for the Republican Party.

Despite moving the district line westward to include the Democratic portion of Pitt County, the enacted district remains virtually a guaranteed Republican victory with a PVI of R+10 (the current NC-3 is R+14). No Democratic member of Congress in the country represents a district that leans this far towards the Republican Party.

Map 5. VTD CCSC for NC-1



NC-2

The enacted 2nd congressional district includes the core of the current NC-1, along with portions of the current NC-4 and NC-13. The area that largely comprises the new NC-2 is currently represented by Democrat G.K. Butterfield and is considered a D+12 district by the Cook Political Report, making it a safe Democratic seat. Butterfield has the longest uninterrupted tenure of any member of North Carolina's congressional delegation. Under the enacted map, however, Butterfield's district changes radically, loses many of its Democratic strongholds (including the aforementioned loss of the Democratic areas in Pitt County) and now picks up enough Republican voters to move the district to "even," according to the Cook Political Report. For example, NC-2 picks up Caswell County, which does not include a single Democratic-leaning VTD, according to the 2020 Attorney General/Secretary of Labor CCSC in the map shown below. The 2020 Presidential vote share and CCSC score reinforce that this is an extremely competitive district. This is an enormous shift for what was formerly a Democratic stronghold.

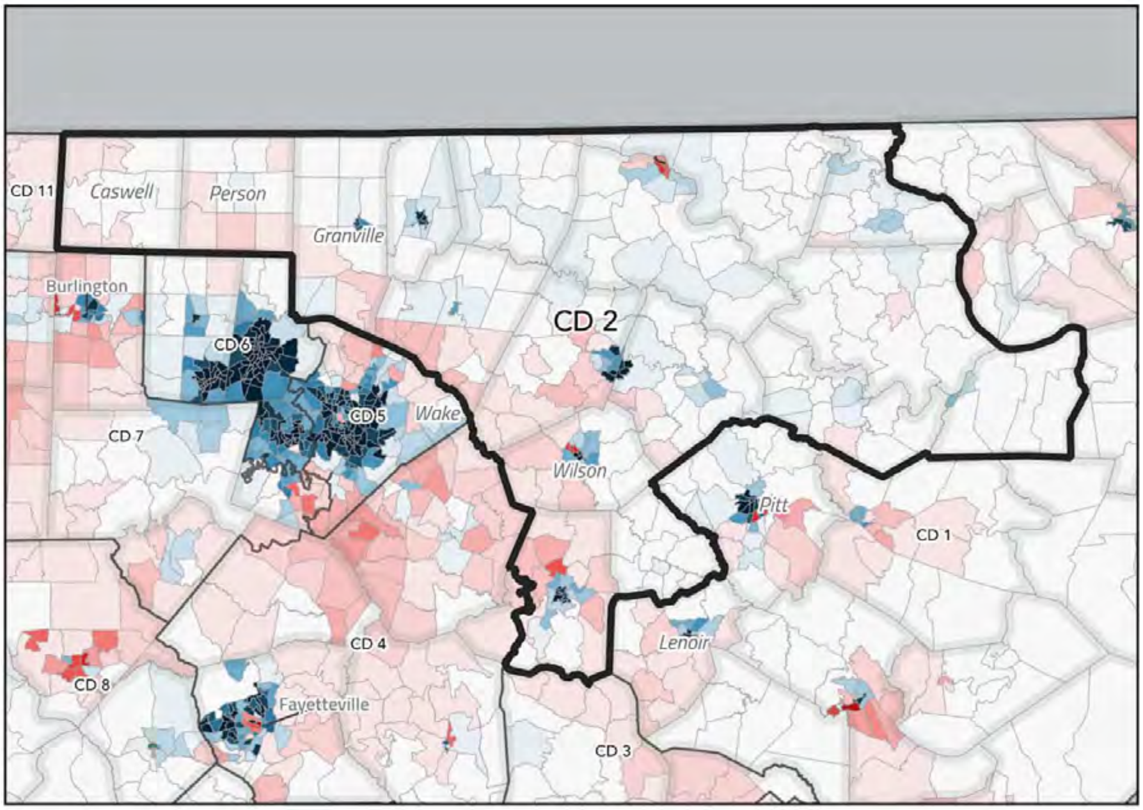
In addition to producing a clear partisan shift, the district is difficult to understand from a communities of interest perspective. The enacted district no longer includes any of Pitt County, nor does it include the campus of East Carolina University, which provided much of the economic engine of the district. The district now stretches from the Albemarle Sound to the Raleigh-Durham-Chapel Hill metropolitan area and eventually terminates in Caswell County, just northeast of Greensboro. Notably, Washington County and Caswell County have never been paired together in a congressional map in the history of North Carolina, further illustrating how little these counties have in common.

At a micro-level, the changes will split communities in important ways. For example, the cut-out in Wayne County, just west of Goldsboro, splits the students and families in Westwood Elementary School (which is located in NC-2) into two separate districts (NC-2 and NC-4). At one point, NC-2 passes through a narrow cut-off between the Neuse River to Old Smithfield Road that is less than one-third of a mile wide.

After the maps were enacted, G.K. Butterfield announced that he will not seek re-election,[21] making the district even more likely to shift to the Republican Party. If the Republicans take over this seat, it will be the first time that this part of North Carolina has been represented by a Republican since the late 19th Century.

[21] Bryan Anderson, "Democrat Rep. Butterfield to Retire, New District is a Toss-Up," *Associate Press News*, *available at* https://apnews.com/article/elections-voting-north-carolina-voting-rights-redistricting-e221c0732f457b2273f54ef102424eca.

Map 6. VTD CCSC for NC-2



NC-3

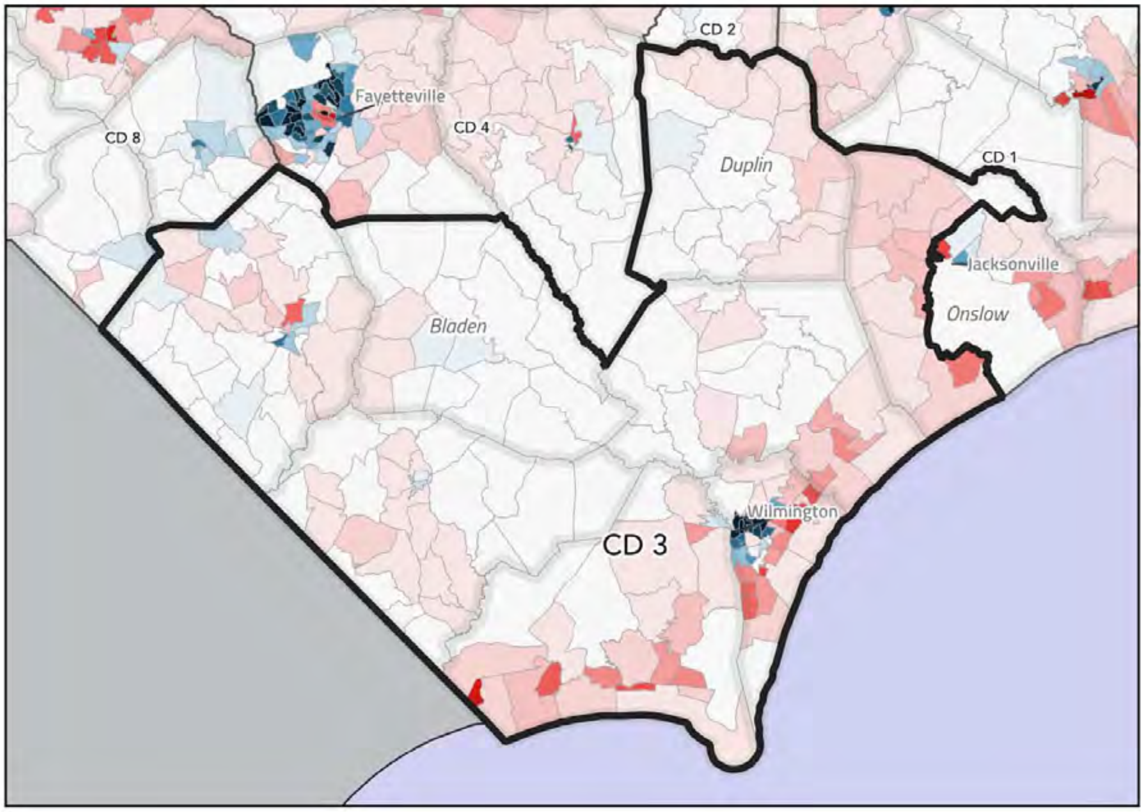
The enacted 3rd congressional district is mostly carved out of the current 7th congressional district, but also includes portions of the current 3rd and 9th districts. The current 7th district is considered R+11 by the Cook Political Report.

As enacted, this district once again denies North Carolina's Sandhills a consistent district of their own, despite repeated calls during the redistricting process,[22] and instead places portions of the Sandhills with the coastal enclave in and around Wilmington. The enacted map also creates an odd appendage in Onslow County that, as described in the section on NC-1, makes little sense from a communities of interest perspective.

The enacted district will almost certainly elect a Republican. It is slightly less Republican than the current NC-7 but still is considered R+10 by the Cook Political Report. It favored the Republicans by over 110,000 votes in the 2020 Attorney General/Secretary of Labor CCSC, and Donald Trump won the district with 58% of the vote. It is currently represented by Republican David Rouzer and is expected to remain in Republican hands.

[22] *See, e.g.*, Dreilinger, Danielle, "1 woman, 1 North Carolina address, 5 congressional districts. As North Carolina prepares to add a 14th congressional seat, Sandhills residents asked: why can't it be theirs? *Fayetteville Observer*. November 5, 2021.

Map 7. VTD CCSC for NC-3



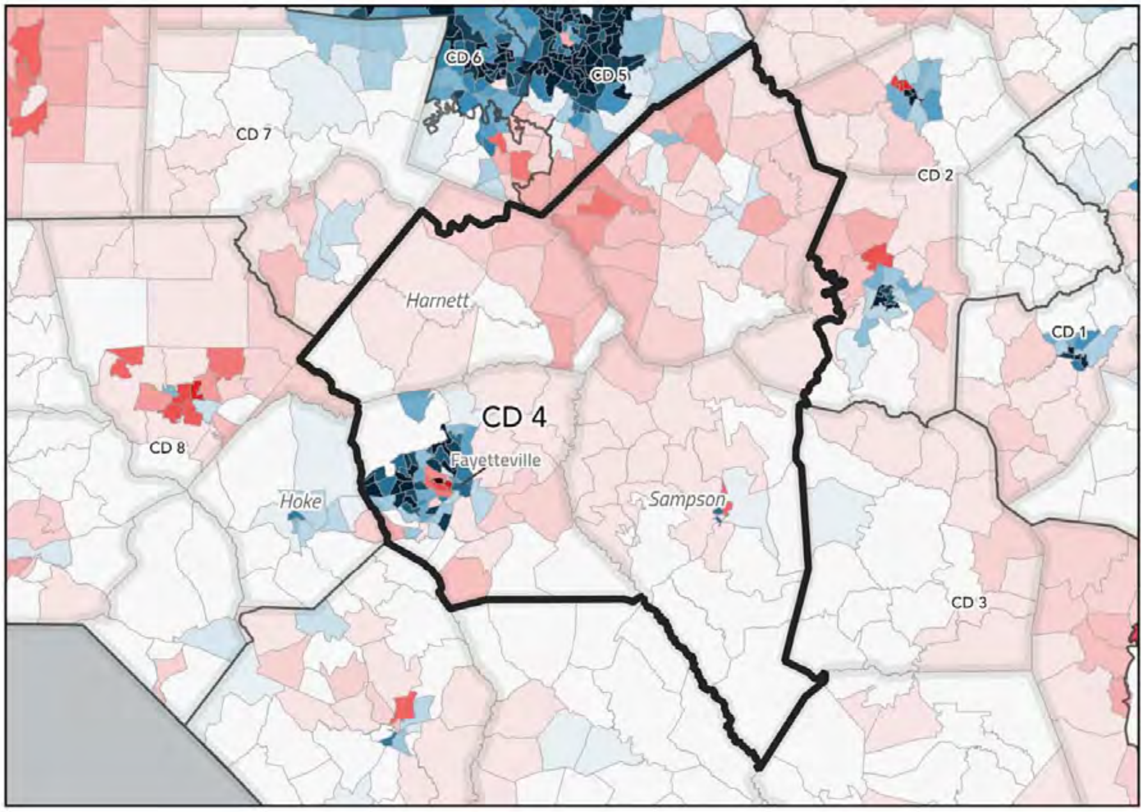
NC-4

The enacted 4th congressional district is carved out of a pocket of North Carolina that includes Johnston County and a portion of Harnett County, both of which are adjacent to Wake County, as well as portions of the Sandhills. The district is pieced together out of leftover portions from current districts 7 and 8, which were R+11 and R+6, respectively. It combines the Democratic-leaning area of Fayetteville with those areas to create a Republican-leaning district.

In addition to the carve out of Republican-leaning VTDs in Wayne County referenced above, this district takes a series of confusing jogs in the northwest part of Harnett County. A citizen driving southwest on Cokesbury Road would begin in NC-7, then rest on the line between NC-7 and NC-4, then into NC-4, then back on the line between the two, just before Cokesbury turns into Kipling Road whereupon the driver would move back into NC-4.

This district, which has no incumbent, is considered an R+5 district by the Cook Political Report, gave 53% of its vote share to Donald Trump in 2020, and gave an advantage to Republicans of about 28,000 votes in the 2020 Attorney General/Secretary of Labor CCSC.

Map 8. VTD CCSC for NC-4

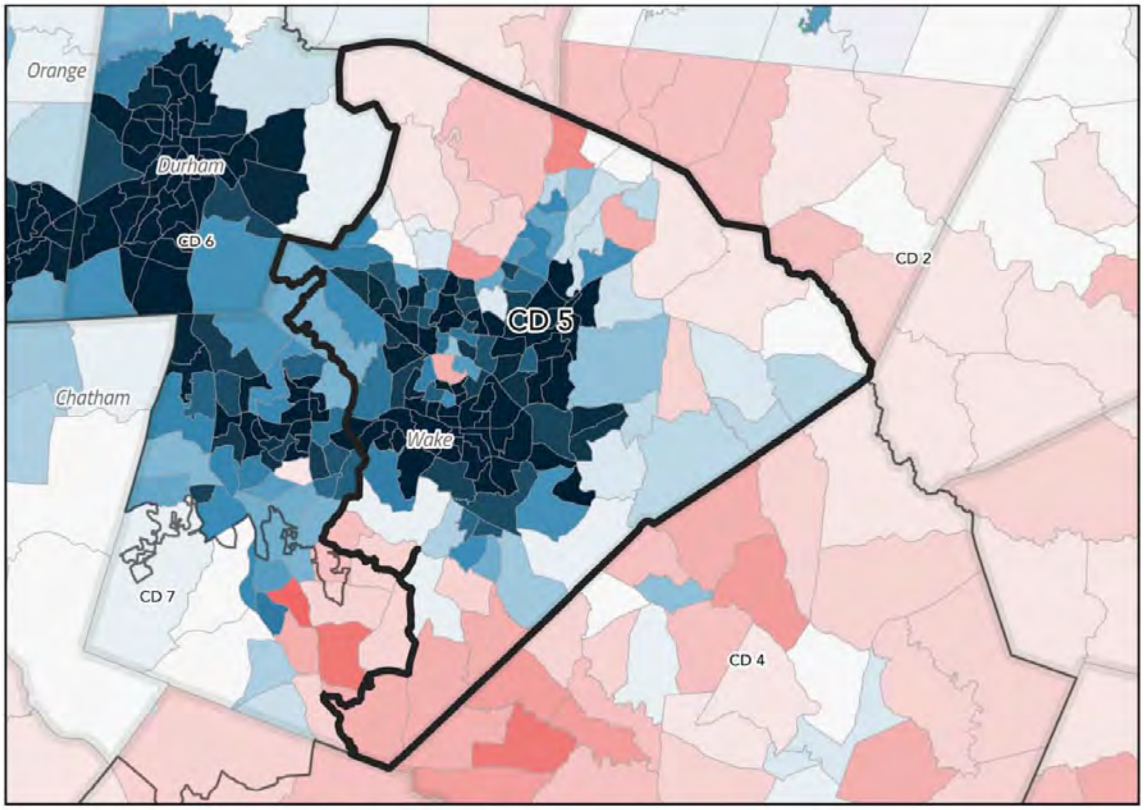


NC-5

The enacted map cracks Democrats in Wake County into three districts (NC-5, NC-6, and NC-7). Unlike NC-6 and NC-7, NC-5 is situated completely within Wake County and is made up of portions of current NC-2 and NC-4, districts that were D+12 and D+16. The effects of this are to pack Democratic voters into one district, thus increasing the probability that Republicans can win at least one of the adjacent districts. The enacted district is rated by the Cook Political Report as D+12, the CCSC shows a Democratic advantage of over 227,000 votes, and Donald Trump won just 34% of the vote.

This map clearly splits communities of interest. In one particularly egregious example, a small vein runs up Fayetteville Road by McCullers Crossroads in Fuquay-Varina, where the vein itself is in NC-7 and the areas on either side of it are in NC-5.

Map 9. VTD CCSC for NC-5

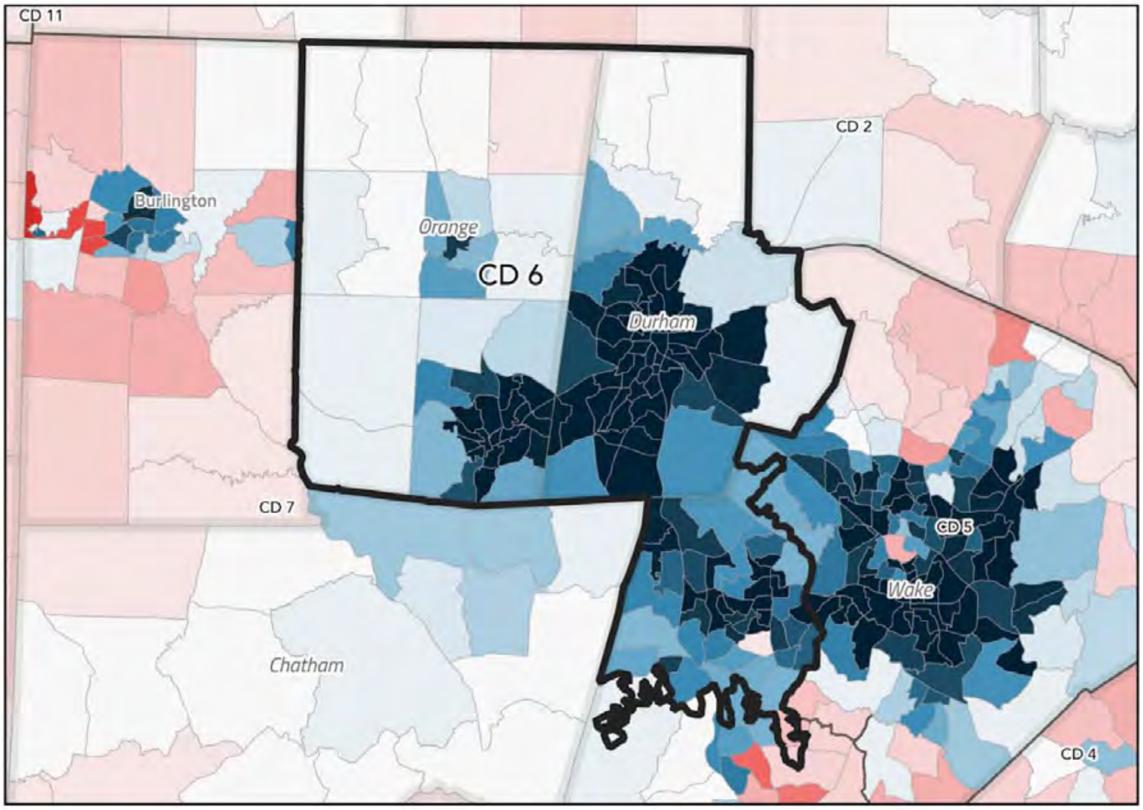


NC-6

The 6th district packs all of Orange and Durham counties and part of Wake County together into one overwhelmingly Democratic district, which is created out of portions of the current NC-4 and NC-2 (D+16 and D+12, respectively). As the map below demonstrates, the enacted NC-6 only includes four marginally Republican VTDs, according to the 2020 Attorney General/Secretary of Labor CCSC. Cook Political Report estimates this to be a D+22 district, Democrats had more than a 374,000 vote advantage in the CCSC and Donald Trump won only 25% of the vote in 2020. This district packs a greater proportion of Democratic voters in a single district than any district from the previous map. This district, like NC-5, includes Wake County, which is divided across three districts in the enacted map. The packing of Democrats in this district enables adjacent districts, in particular NC-7, to be drawn in ways that make it easier for Republican candidates to win.

The contours of this district bordering NC-7, on the southern end, split communities of interest in almost comical ways. In one example, a person traveling south on New Hill Olive Chapel Road would, in a matter of a few miles, move from NC-7 to the line between NC-6 and NC-7, back into NC-7, through NC-6, back into NC-7, back to the border between the two, back into NC-7, back to the border between the two, then back into NC-7. The contours of these lines are confusing to voters, and, as the map demonstrates, serve to pack as many Democratic precincts as possible into NC-6.

Map 10. VTD CCSC for NC-6

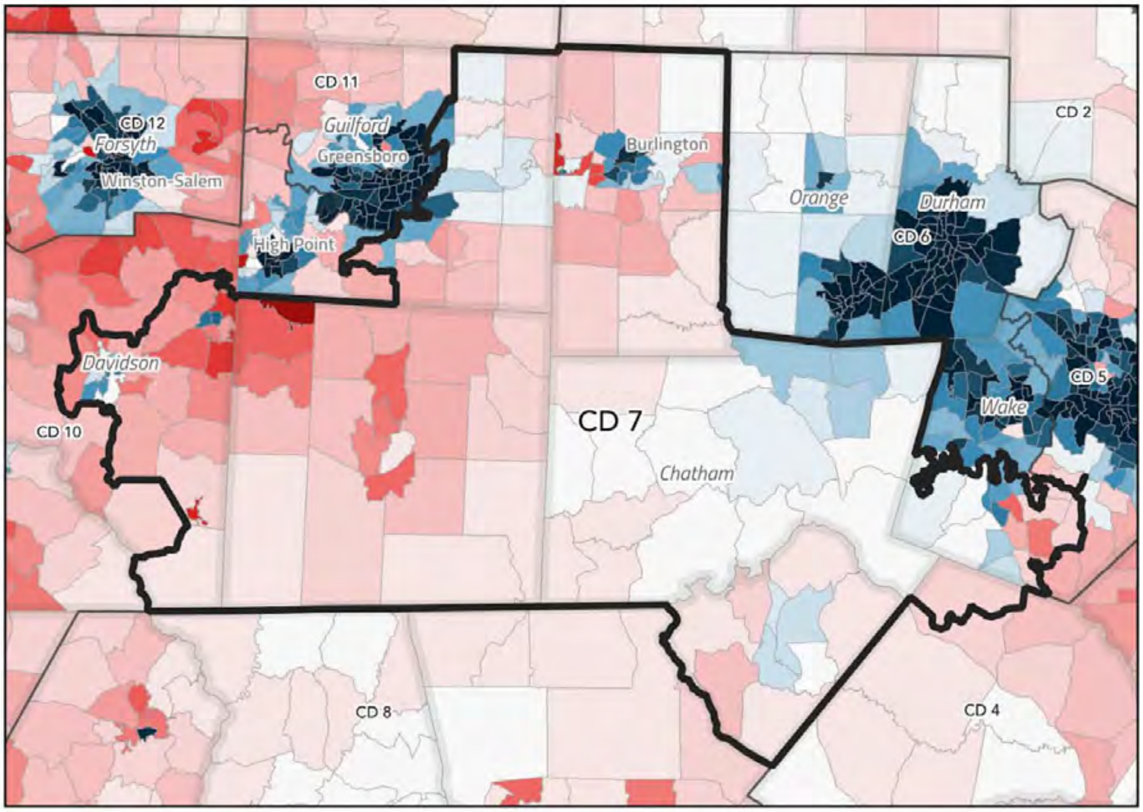


NC-7

The enacted 7th district includes the Republican-leaning Randolph, Alamance, Chatham, and Lee counties as well as portions of Guilford, Wake, and Davidson counties. It is carved out of current districts 13, 6, 4, and 2. As it is drawn, NC-7 splits both Guilford and Wake counties (each of which of is divided three times in the map as a whole). Despite including portions of two of the most Democratic counties in North Carolina, the district studiously avoids the Democratic-leaning areas of both counties. The eastern portion of the district in Wake County, near Apex, takes the unusual and confusing contours described in the description of NC-6 above.

The enacted NC-7 is considered R + 11 by the Cook Political Report, it gave Republicans a 115,682 vote advantage in the CCSC, and Donald Trump won 57% of the vote in this district. A Democratic candidate has virtually no chance of victory in the enacted 7th.

Map 11. VTD CCSC for NC-7

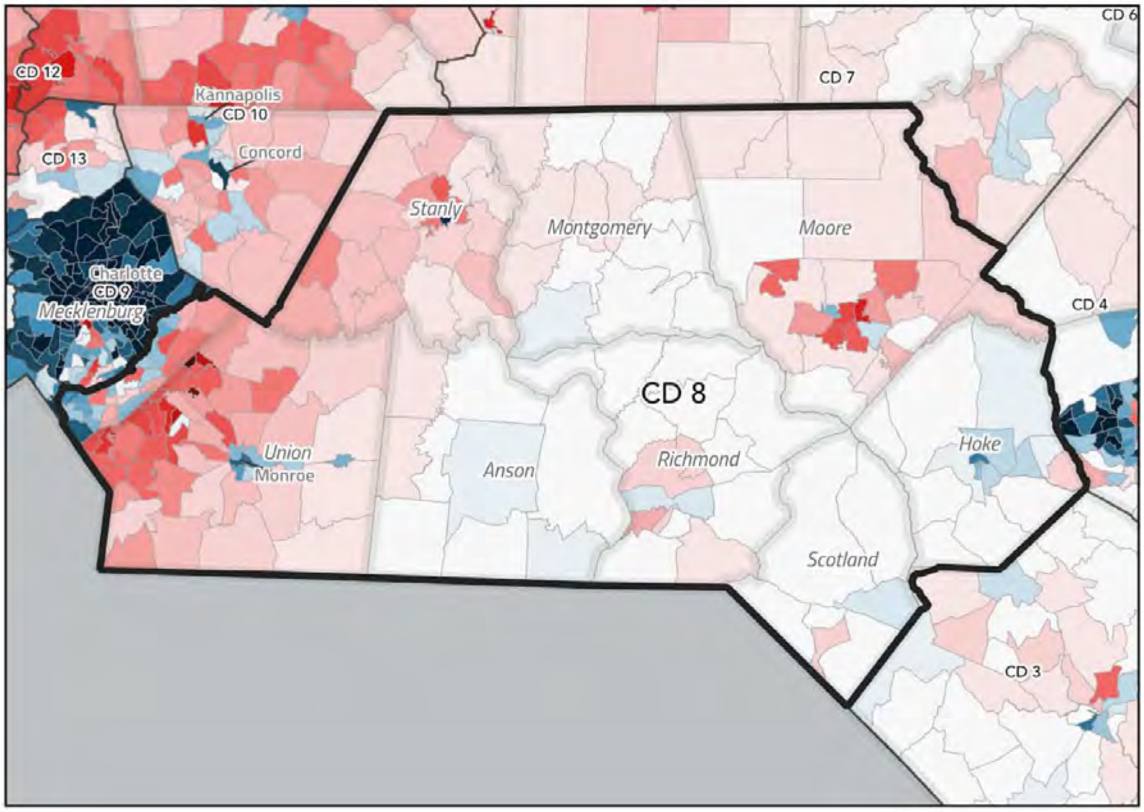


NC-8

The 8th district stretches from the Sandhills into Mecklenburg County and includes portions of the current 9th, 12th, and 8th districts. The core of the district comes from the current 9th district, which is R+6. The enacted NC-8 includes the entirety of Scotland, Hoke, Moore, Montgomery, Richmond, Anson, Union, and Stanley counties as well as the southern and eastern edge of Mecklenburg County. Although it includes portions of Mecklenburg County, one of the most Democratic-leaning areas in the state, as well as Democratic municipalities in Union, Anson, and Hoke, the 8th district is unlikely to elect a Democrat under any reasonable scenario. The enacted map stops just shy of the some of the darkest blue VTDs in Mecklenburg County.

The Cook Political Report calls the enacted NC-8 an R+11 district, the CCSC shows that the Republican candidate garnered over 115,000 more votes than the Democratic candidates for the two closest Council of State races, and Donald Trump won approximately 57% of the vote in the 2020 election.

Map 12. VTD CCSC for NC-8



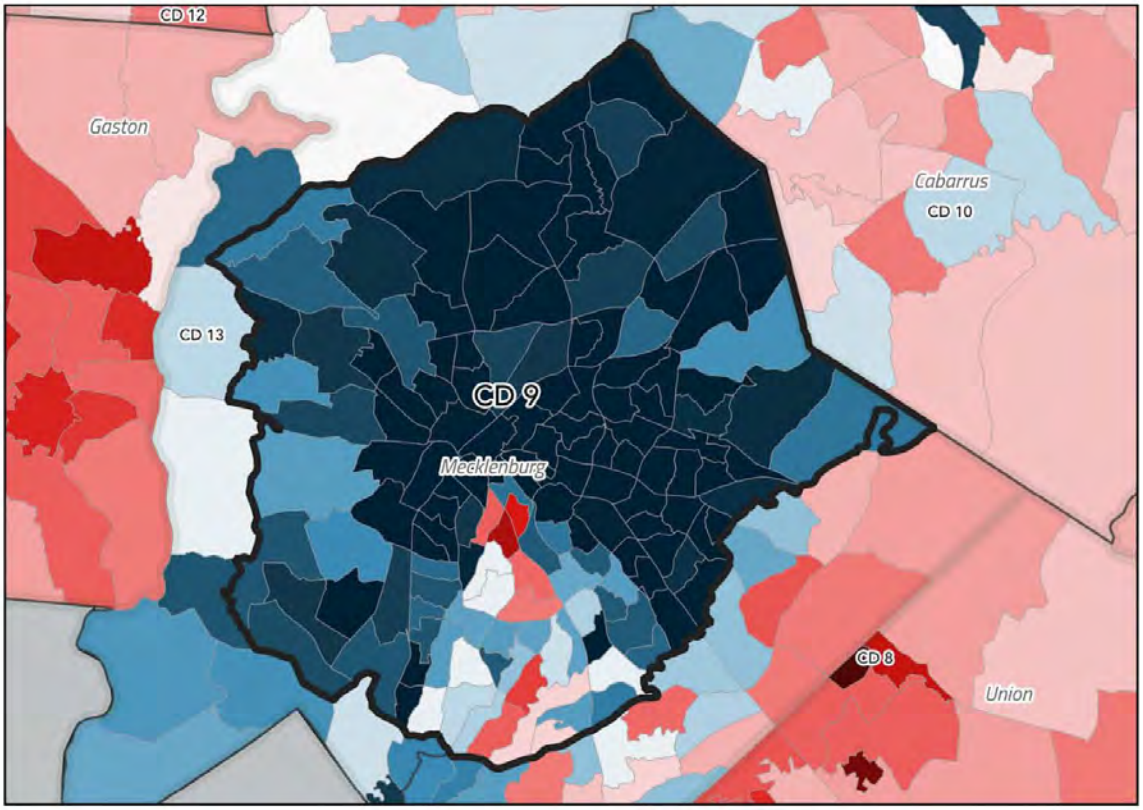
NC-9

The core of the enacted 9th congressional district comes from the current NC-12, but it also includes portions of the current NC-9. The result is the most packed district in the enacted map. The Cook Political Report rates the enacted NC-9 as a D+23 district, meaning that it leans more heavily towards the Democratic Party than any district in the last map. Donald Trump won just 25% of the vote in this district in the 2020 Presidential election and the CCSC indicates that the Democrats won over 325,000 more votes than the Republicans in the two closest Council of State races in 2020.

As with all examples of packing, the key to understanding this district is its effects on the surrounding districts. By ensuing that the Democratic candidate in NC-9 wins by an overwhelming margin, Republican voters will be more efficiently distributed across other districts, where they can have a greater affect on the outcome than they would otherwise. This ensures that neighboring NC-8, for example, will not be competitive. This also has the effect of ensuring that Republican voters in NC-9 have no chance of securing representation from a member of their own party.

The geographic contortions of this district are most apparent on its western edge, where a mere eight miles separates the western edge of NC-9 and the Mecklenburg County line.

Map 13. VTD CCSC for NC-9

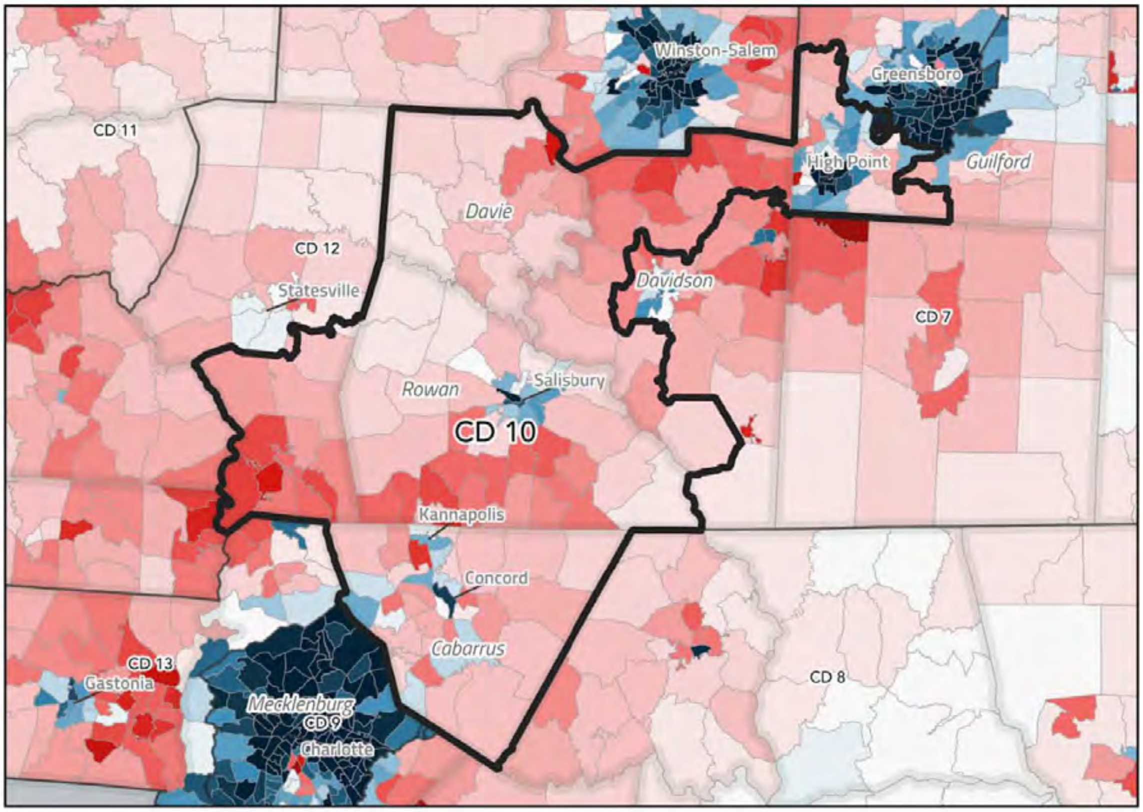


NC-10

The enacted NC-10 includes all of Rowan, Cabarrus, and Davie counties and parts of Iredell, Davidson, and Guilford counties. It is drawn out of portions of the current 10th, 9th, 6th, and 13th districts. Despite the inclusion of carefully curated portions of Democratic Guilford County, this district is a safe Republican seat and effectively removes any possibility that Democratic voters in High Point, Salisbury, Kannapolis, Concord, and elsewhere in Cabarrus can elect a member of their own political party. The Cook Political Report rates this district as R+14, the CCSC indicates that Republicans won more than 156,000 additional votes in the two key council of state races, and Donald Trump won over 60% of the Presidential vote in the enacted district.

NC-10 includes High Point, while NC-11 includes most of Greensboro and NC-12 contains Winston-Salem, meaning that the enacted map splits all three points of North Carolina's Piedmont Triad into separate congressional districts that favor Republicans. In the current map, this community of interest is together in NC-6, represented by Democrat Kathy Manning.

Map 14. VTD CCSC for NC-10



NC-11

The enacted 11th congressional district is carved out of the current 5th, 10th, and 6th districts. This map places a portion of Guilford County, including the City of Greensboro, in a district with Rockingham, Stokes, Surry, Alleghany, Ashe, Wilkes, Caldwell, and Alexander counties as well as a tiny boot-shaped sliver of Watauga County.

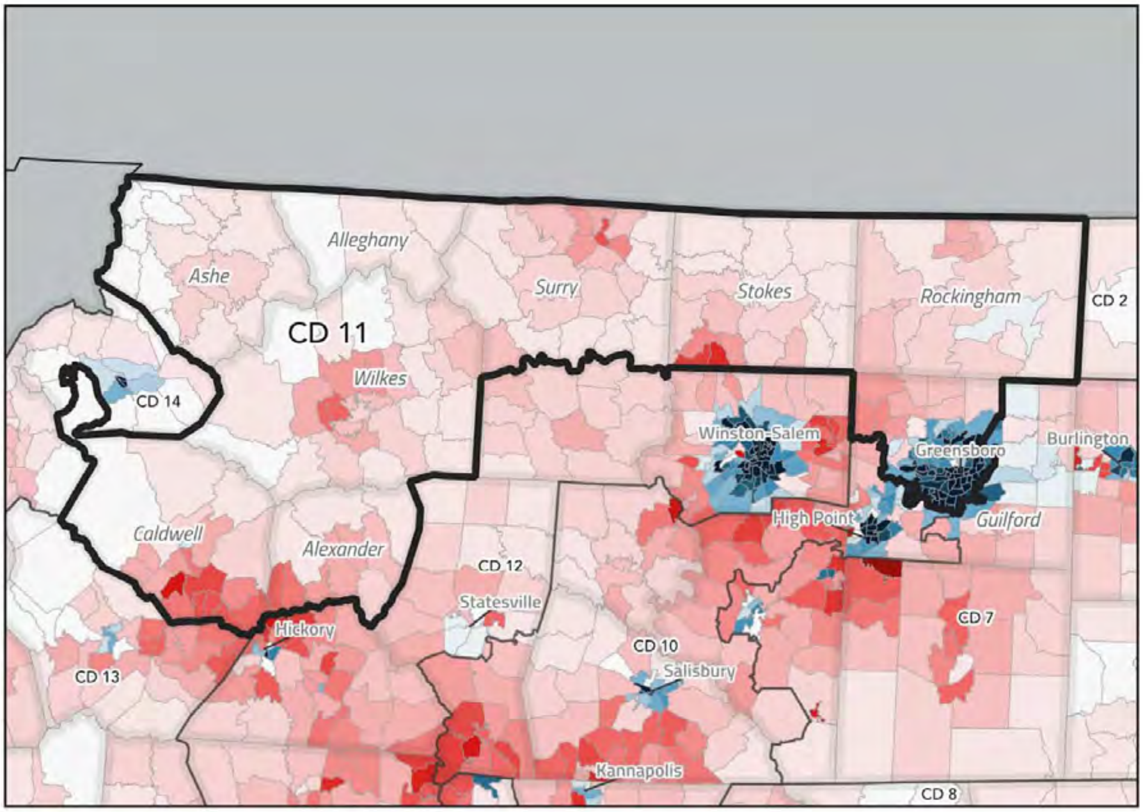
As discussed elsewhere, the enacted map splits Guilford County across three districts (the 10th, 11th, and 7th) and puts all three points of the Piedmont Triad in separate districts. By placing most of Greensboro in this overwhelmingly Republican district, the map ensures that the City of Greensboro, among the most Democratic and racially diverse cities in the state of North Carolina, will not be represented by a Democrat.

The enacted district is rated by Cook as R+9, 57% of the district voted for Donald Trump in the 2020 election, and Republicans held a 94,000 vote lead in the two closest Council of State elections. No Democrat in the current Congress represents a district that leans this heavily Republican.

It is difficult to imagine any sense in which some of the locations in this district have shared community interests. Geographically, NC-11 spans radically different parts of the state. Greensboro is firmly in the Piedmont, resting at under 900 feet elevation. Watauga and Ashe counties, by comparison, reside in the high country, with elevations that consistently run above 5,500 feet. The corners of the district have different area codes, are served by different media markets, and share virtually no characteristics in common other than the fact that they are both within North Carolina. In the history of North Carolina, Caldwell and Rockingham counties have never shared a congressional representative.

In addition to its geographic span, the enacted district stands out for its double-bunking of Republican Virginia Foxx and Democrat Kathy Manning. To shoe-horn Foxx into the new district, the mapmakers carved out a tiny sliver of Watauga County to allow her house to fall into the redrawn district. This passage is so narrow, in fact, that it is connected by a stretch of land that is roughly three miles wide and requires a traverse of the Daniel Boone Scout Trail.

Map 15. VTD CCSC for NC-11

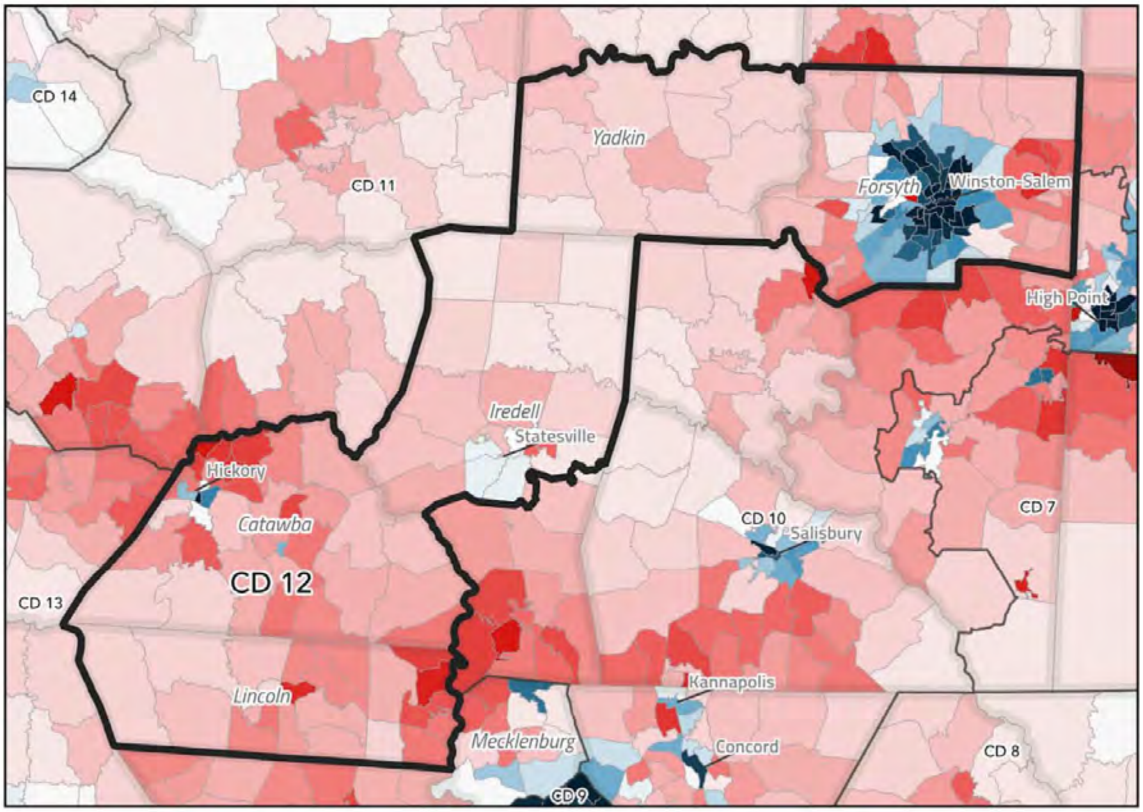


NC-12

The 12th congressional district stretches from Lincoln County at the southwestern corner, through Catawba, the northern part of Iredell, Yadkin, and Forsyth counties. As the map below makes clear, by including Winston-Salem with this overwhelmingly red swath of geography and walling it off from Democratic voters in High Point, the enacted map ensures that Republican Congressman Patrick McHenry, who lives at the southeast corner of this district, will maintain his seat and the Democratic voters in Winston-Salem will have virtually no chance to elect a member of their own party.

The Cook Political Report rates this district as R+9, Republicans had over a 100,000 vote margin in the two closest Council of State races, and Donald Trump won over 56% of the vote in this district.

Map 16. VTD CCSC for NC-12



NC-13

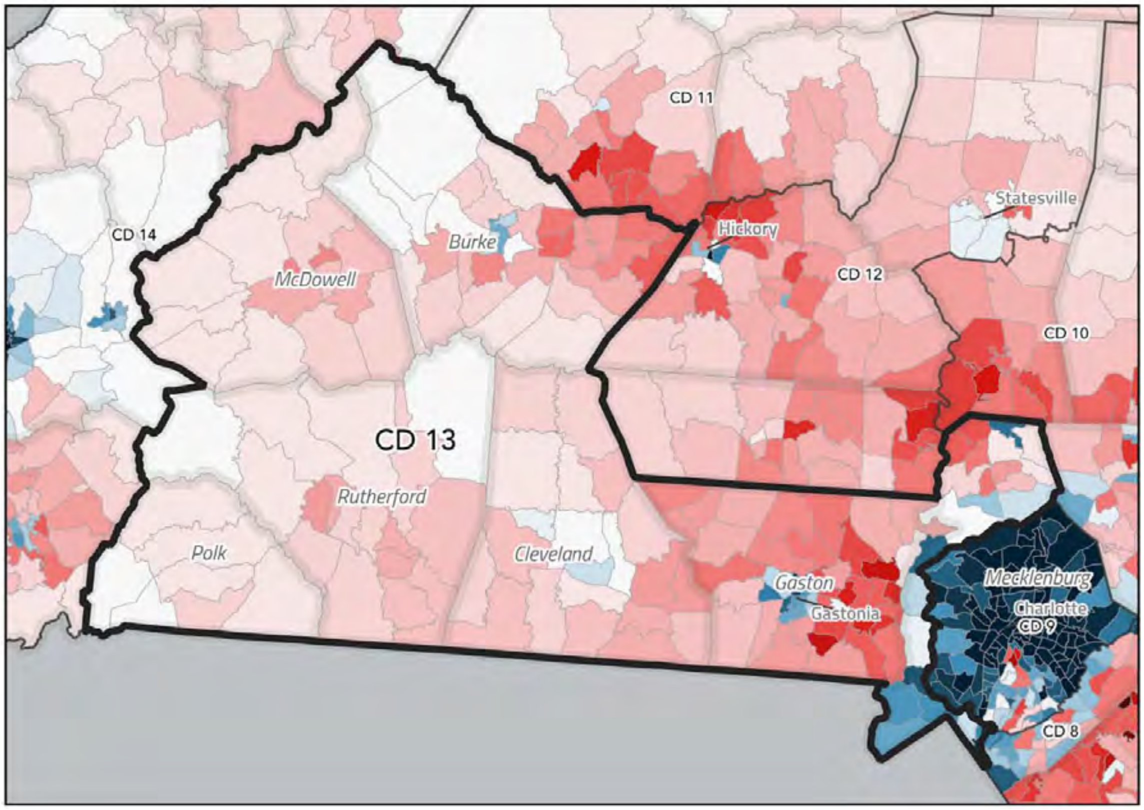
The 13th congressional district is carved out of portions of the current 11th, 5th, 12th, and 10th districts. As the map that follows demonstrates, the district includes Polk, Rutherford, McDowell, Burke, Cleveland, and Gaston counties, as well as part of Mecklenburg County.

The district was generally understood to be created for Republican Speaker of the House Tim Moore who lives in Cleveland County—*The Raleigh News and Observer and Charlotte Observer*'s editorial board even referred to it as "Moore's designer district."[23] Republican Madison Cawthorn recently announced that he will run in the 13th, and Moore soon noted that he would stay in the General Assembly. While the specifics of the candidates have changed, the fact that this is a Republican district that will elect a Republican candidate has not. This district was rated by the Cook Political Report as R+13, has a CCSC of R+150,187 votes, and gave 60% of its votes to Donald Trump in 2020.

As mentioned in the discussion of NC-9, the narrow passageway that is necessary to squeeze NC-13 into Mecklenburg County only consists of a few miles at one point—stretching from a Food Lion to the Mecklenburg County line. The enacted district also creates unusual pairings of counties that share little in common. For example, Polk and Mecklenburg counties have never resided in the same district.

[23] "Try not to Laugh at What Madison Cawthorn Just Did to NC Republicans," *Charlotte Observer*, November 13, 2021, https://www.charlotteobserver.com/opinion/article255769626.html.

Map 17. VTD CCSC for NC-13

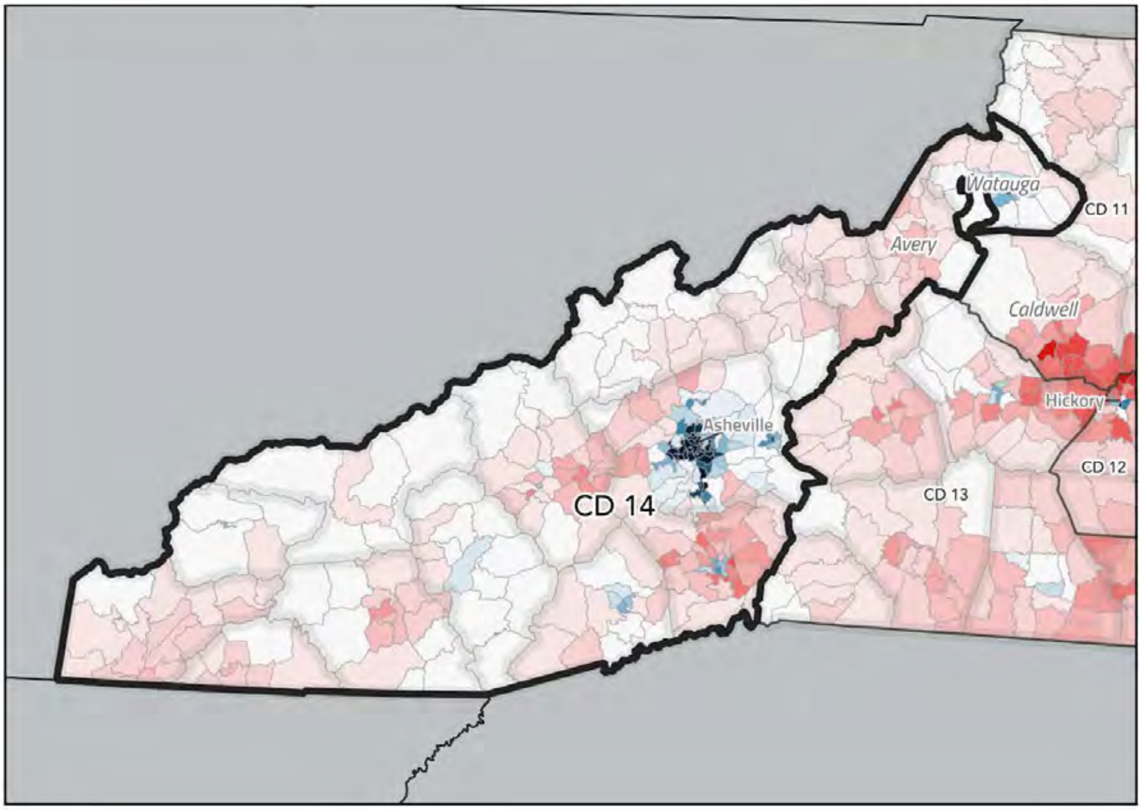


NC-14

The enacted 14th district includes most of the current 11th district as well as part of Watauga County, which previously sat in the 5th district. The current 11th district also lost the Republican strongholds of Polk and McDowell counties, as well as part of Rutherford County, which are now in the 13th district. These changes shifted the enacted NC-14 slightly in the Democratic direction (from a PVI of R+9 to R+7), although not enough to give a Democratic candidate a reasonable chance of victory. No Democrat in Congress represents a district that has a PVI score that leans this heavily towards the Republican Party. As a result, the 14th is expected to stay squarely in Republican hands.

Geographically, the 14th is a sprawling district that includes three media markets. Traversing the district from its western end in Murphy to its northeastern corner in Stony Fork would take approximately four hours. Perhaps because of the geographic incompatibility, Watauga County has not been in a district with the western end of the state since 1871—before Graham and Swain counties were even in existence. Adequately representing this massive swath of geography would be difficult for any member of Congress—Republican or Democrat.

Map 18. VTD CCSC for NC-14



General Assembly District Maps

Unlike the Congressional maps, the North Carolina House and Senate maps are minimally constrained by the *Stephenson* county clustering rule. This requires that in order to ensure relative population equality, "all counties get assigned to a distinct 'group' or 'cluster,' which can consist of either a single county or a number of adjacent counties."[24] Some districts, therefore, are contained in single district clusters that cannot be altered. For the remaining districts, however, mapmakers may have one or more types of discretion. There were four different groupings of counties where mapmakers were left to choose between more than one optimal cluster in the Senate map (yielding a total of 16 different potential county cluster maps) and three such county groupings in the House map (yielding a total of eight different potential county cluster maps).[25] And in all clusters where the population allowed for more than one district, the mapmakers had discretion over how to draw lines *within* the cluster.

In all, the General Assembly district maps benefit the Republican Party.

[24] Blake Esselstyn, "A 'Stephenson' explainer," September 2019, *available at* https://frontwater.maps.arcgis.com/apps/Cascade/index.html?appid=a408ed66ea0944308e85fe60e6e940aa.
[25] *See* Christopher Cooper, Blake Esselstyn, Gregory Herschlag, Jonathan Mattingly, and Rebecca Tippett, "NC General Assembly County Clusterings from the 2020 Census," *available at* https://sites.duke.edu/quantifyinggerrymandering/files/2021/08/countyClusters2020.pdf.

Senate Districts

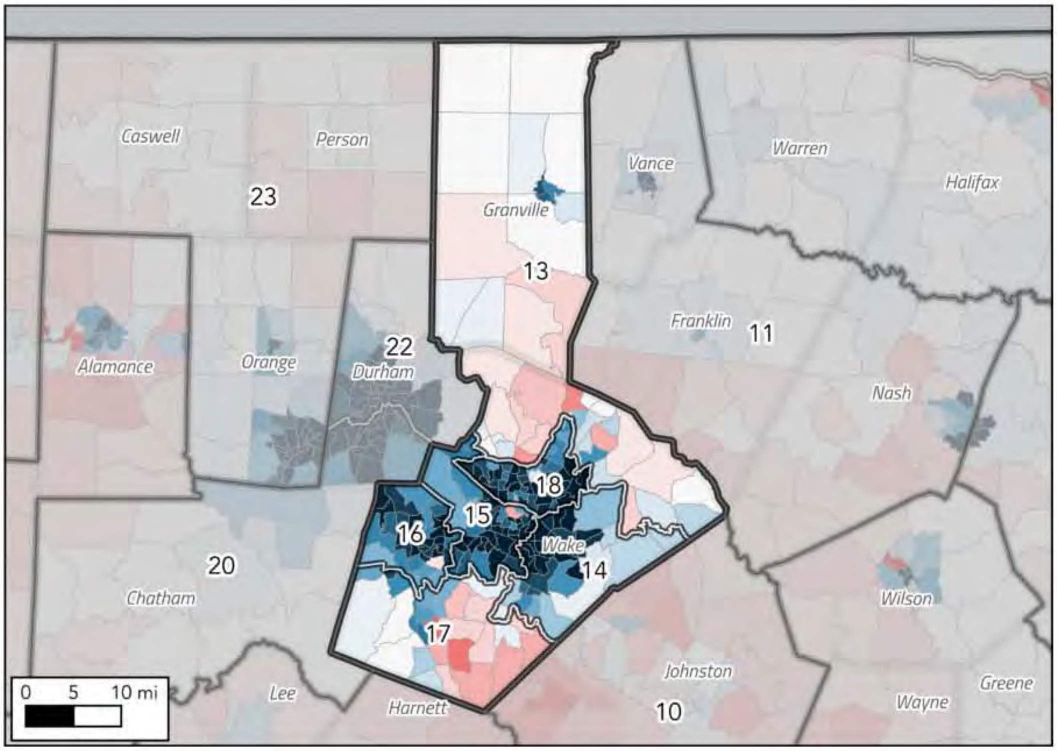
SDs 13, 14, 15, 16, 17, and 18: Granville and Wake County Cluster

Senate districts 13, 14, 15, 16, 17, and 18 are located in a cluster with Wake and Granville counties. Wake County gave 63.5% of its two-party vote share to Joe Biden in 2020. Wake County voters also supported the Democratic candidate for every statewide office and there are no Republicans on the Wake County Commission. On the other hand, Granville County is one of the most purple counties in North Carolina, supporting Donald Trump for President and Democrat Roy Cooper for Governor in 2020.

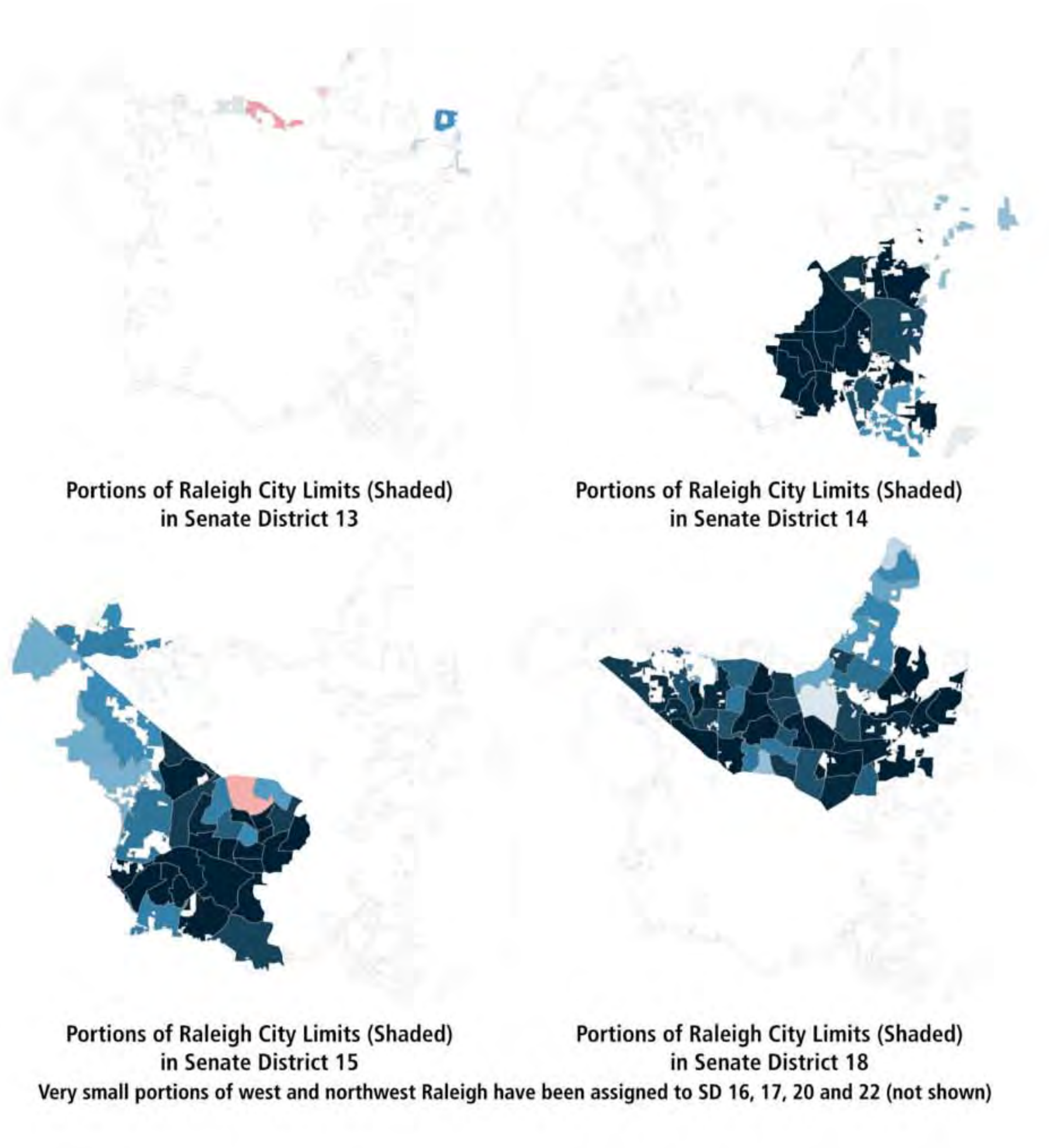
The enacted map packs Democratic VTDs in SDs 14, 15, 16, and 18 (according to the CPI, D+24, D+19, D+16, and D+15, with CCSC scores of D+93,699, D+81,915, D+59,594, and D+68,225, respectively), creating an artificially competitive SD-17 and SD-13 (both of which have a CPI score of 0, indicating no lean and a CCSC score of D+ 3,574 and R+3,686 votes, respectively). SD-13 is created by including all of Granville County and pairing it with Republican VTDs on the northern and northeastern portions of Wake County, avoiding the blue VTDs in North Raleigh, which are left in SD-18 by creating a horn-shaped section that juts up into SD-13.

The second map in this series (Map 20) demonstrates the ways in which the City of Raleigh is strategically divided across four Senate districts.

Map 19. VTD CCSC for the Granville and Wake County Cluster



Map 20. Map of Raleigh Municipal Splits

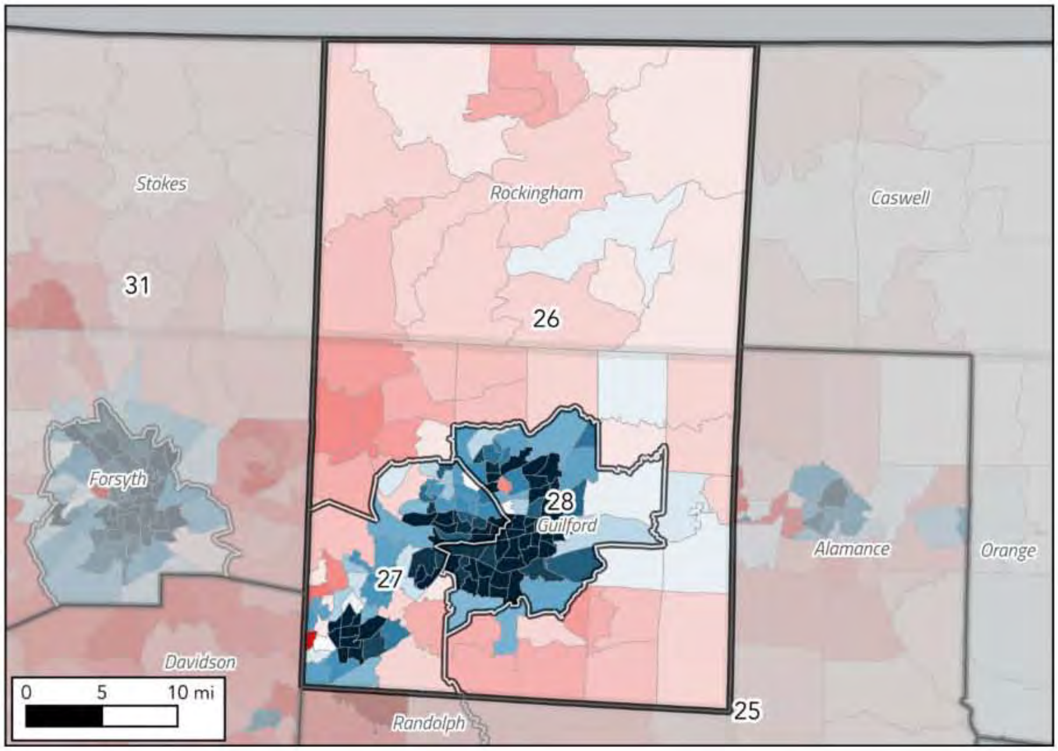


SDs 26, 27, and 28: Guilford and Rockingham County Cluster

Senate districts 26, 27, and 28 are located in a county cluster with Rockingham and Guilford counties. Rockingham County leans heavily towards the Republican Party whereas Guilford is among the most Democratic counties in North Carolina. In 2020, Guilford gave 61.7% of its vote share for President to Joe Biden, the 8th highest in the state. Guilford voters also voted for the Democratic candidate by overwhelming margins in every race decided at the county level in 2020.

The enacted map packs Democrats in SD-27 and SD-28. SD-27 is estimated to be D+12 by the CPI and has a D+50,846 CCSC score; whereas SD-28 is D+27 and has a D+104,632 advantage according to the CCSC. SD-26, on the other hand, includes all of Rockingham County and then extends southwest into Guilford County until it meets the Piedmont Triad International Airport, and east and south until it meets the eastern and southern borders of the county. SD-26's sprawling C-shape allows for a safe Republican (R+11, R+54,396) district by connecting the northern and southern portions of this cluster together.

Map 21. VTD CCSC for the Guilford and Rockingham County Cluster

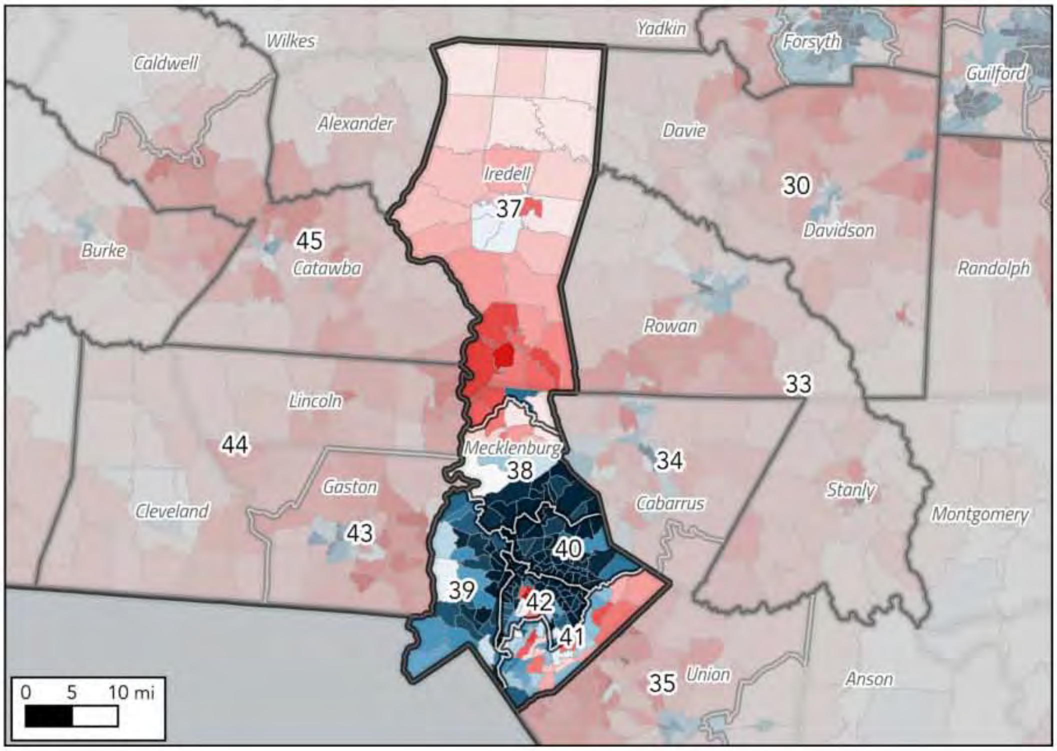


SDs 37, 38, 39, 40, 41, and 42: Iredell and Mecklenburg County Cluster

Senate districts 37, 38, 39, 40, 41, and 42 are located in a grouping that includes Iredell and Mecklenburg counties. Mecklenburg County is the second most populous and among the most Democratic counties in North Carolina. In the 2020 Presidential election, only two other North Carolina counties gave a larger proportion of their two-party vote share to Joe Biden. Every member of Mecklenburg's current state legislative delegation is a Democrat, all nine county commissioners are Democrats, and Democratic candidates received the plurality of the votes in every county-wide contest. It is clearly a Democratic stronghold, and is trending even more so in that direction.

As you can see below, the enacted map packs Democratic voters into SDs 39 and 40; neither includes a single Republican VTD and they are heavily Democratic based on CPI (D+23 and D+33, respectively) and the CCSC scores (D+71,497 and D+90,354, respectively). SDs 38 and 42 are also considered "Safe Democratic" seats (D+17, D+71,597 and D+15, D+65,179, respectively). SD-41, however, is considered a "Toss-up" seat (D+1, D+5,474) and SD-37 is a "Safe Republican" seat (R+13, 64,380). By packing Mecklenburg's Democratic voters in SDs 38, 39, 40, and 42, the mapmakers allowed for SD-41, in the south of Mecklenburg County, to be artificially competitive, while still ensuring that SD-37 remains a safely Republican district. SD-37 is also notable because it double-bunks Democrat Natasha Marcus and Republican Vickie Sawyer into the same district; Marcus' home rests approximately one mile from the border with SD-38.

Map 22. VTD CCSC for the Iredell and Mecklenburg County Cluster

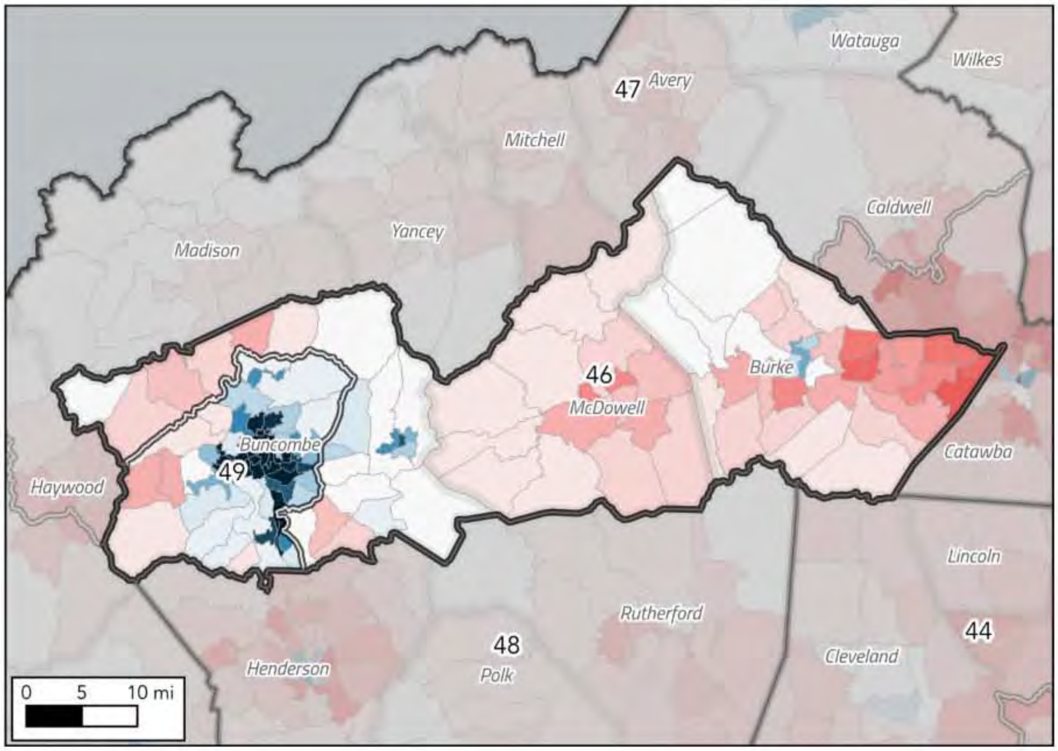


SDs 46 and 49: Buncombe, Burke, and McDowell County Cluster

Senate districts 46 and 49 are located in a county cluster with Buncombe, Burke, and McDowell counties. The map-drawers had considerable discretion here, however, as they could have instead paired Buncombe County with Henderson County, a much more natural fit since northern Henderson County, in particular, has become a bedroom community of Asheville (in Buncombe), and has considerable shared natural interests. Instead, Buncombe is paired with McDowell and Burke counties. It would take someone an hour and 45 minutes to pass from Sandy Mush on the west side this cluster to Hickory on the east side, and would almost certainly necessitate driving through both Senate districts. The enacted map also separates Asheville from the Asheville Watershed.

The effect of this choice is to pack Democratic voters in SD-49 (D+16), leaving the geographically expansive SD-46 to favor the Republican Party (R+13). By pairing Henderson with Polk and Rutherford counties in the cluster to the south, the map also creates a district heavily favored for the Republican Party in that cluster, SD-48. After the maps were enacted, incumbent Republican Chuck Edwards (currently in the Senate district covering Buncombe, Henderson, and Transylvania counties) announced he would be running for Congress and Republican State House Representative Tim Moffitt (whose current House district is in Henderson County) announced he would be running for Edwards' vacated Senate seat.

Map 23. VTD CCSC for the Buncombe, Burke, and McDowell County Cluster

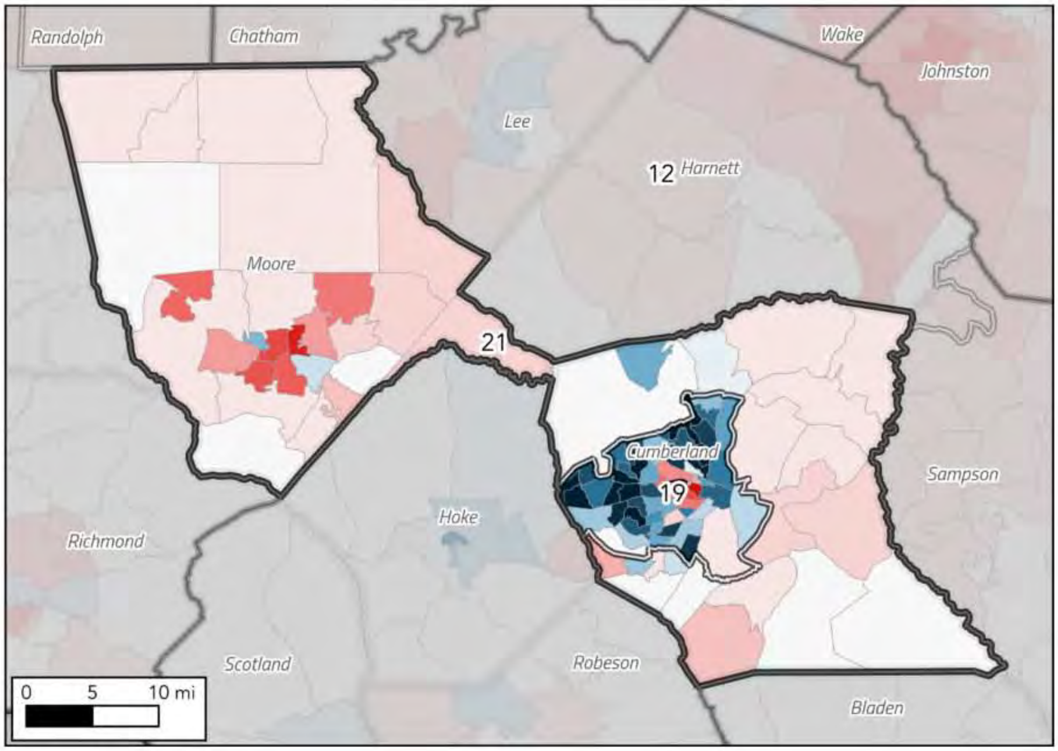


SDs 19 and 21: Cumberland and Moore County Cluster

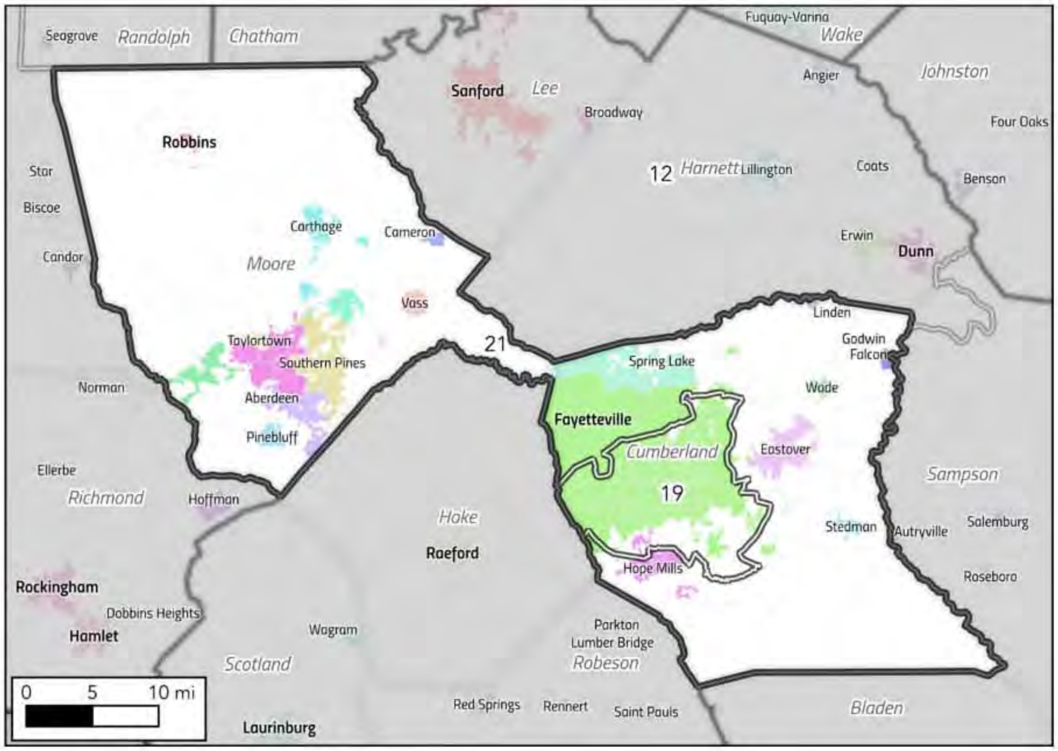
Senate districts 19 and 21 are located in a county cluster with Cumberland and Moore counties. The enacted map packs Democratic voters in and around Fayetteville into SD-19, a district that is rated D+17 by the CPI and advantaged the Democratic Party by 64,539 votes in the CCSC. SD-21 is then left to favor the Republican Party by R+9 and 41,391 votes.

As demonstrated in Map 25, the enacted map splits Fayetteville and Hope Mills across two districts and, as Map 24's red-and-blue shading displays, the district boundaries are careful to separate off Democratic voters and VTDs in SD-19 from adjacent Republican VTDs.

Map 24. VTD CCSC for the Cumberland and Moore County Cluster



Map 25. Municipal Splits for the Cumberland and Moore County Cluster



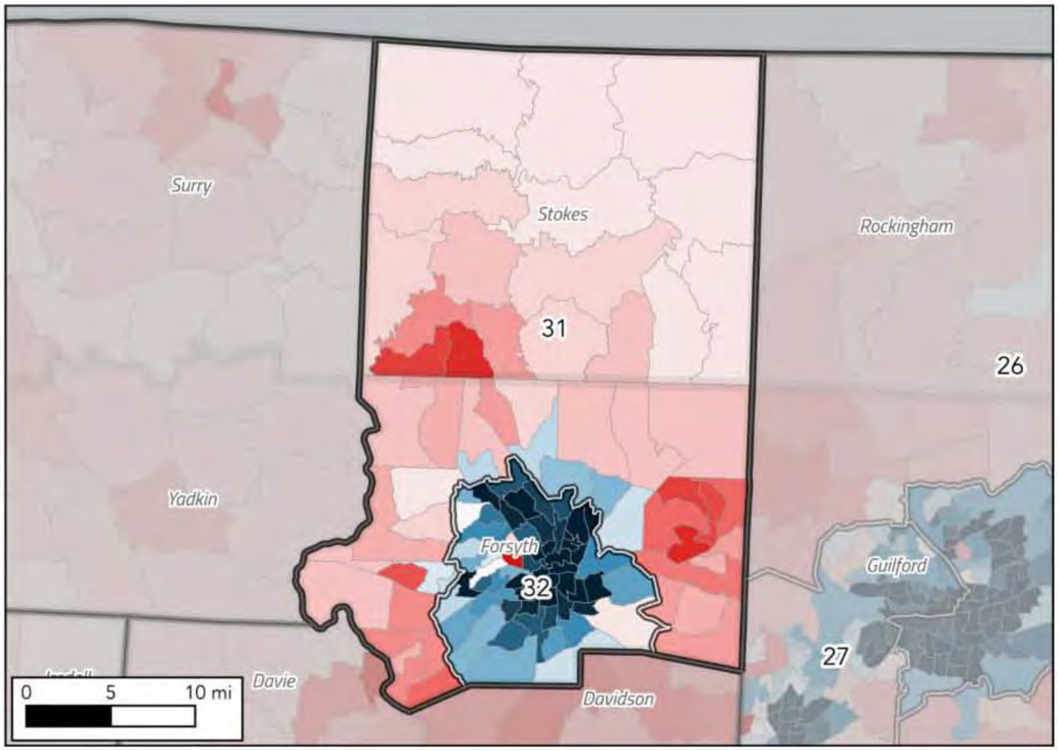
SDs 31 and 32: Forsyth and Stokes County Cluster

Senate districts 31 and 32 are located in a county cluster with Forsyth and Stokes counties. A few choices created the partisan effects of this cluster. First was the choice of the cluster, itself. The mapmakers had a choice about whether to pair Forsyth with Stokes or with Yadkin to the west. Yadkin has a lower Republican vote advantage per the CCSC. Therefore the decision to pair Forsyth with Stokes, instead, helped tip the scales towards a Republican advantage. The decisions made within the cluster reinforced that advantage.

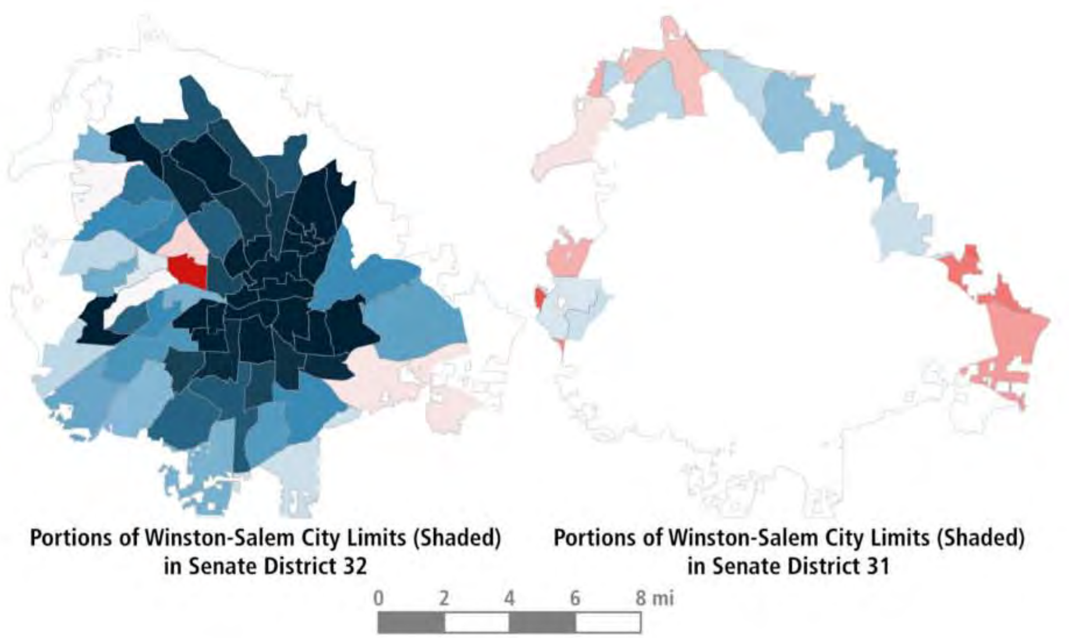
In a now familiar pattern, the enacted map packs Democratic voters in SD-32 (D+20, D+77,058) and leaves the remaining district in the cluster squarely in Republican hands. SD-31 favors the Republican Party by R+11; the CCSC favors the Republican Party by 58,073 votes.

Map 27 displays the strategic split in Winston-Salem with the most Democratic VTDs in that city packed into SD-32 while Republican SD-31 captures the more Republican VTDs on the city's edges.

Map 26. VTD CCSC for the Forsyth and Stokes County Cluster



Map 27. Map of Winston-Salem Municipal Splits

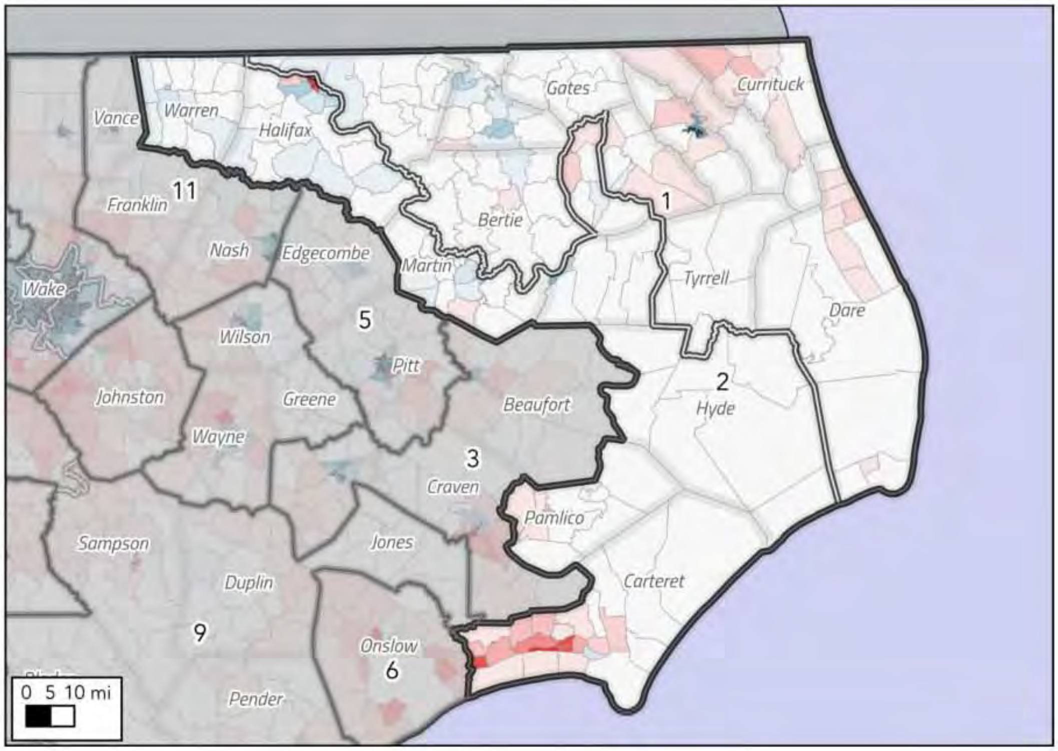


SDs 1 and 2: Northeastern County Clusters

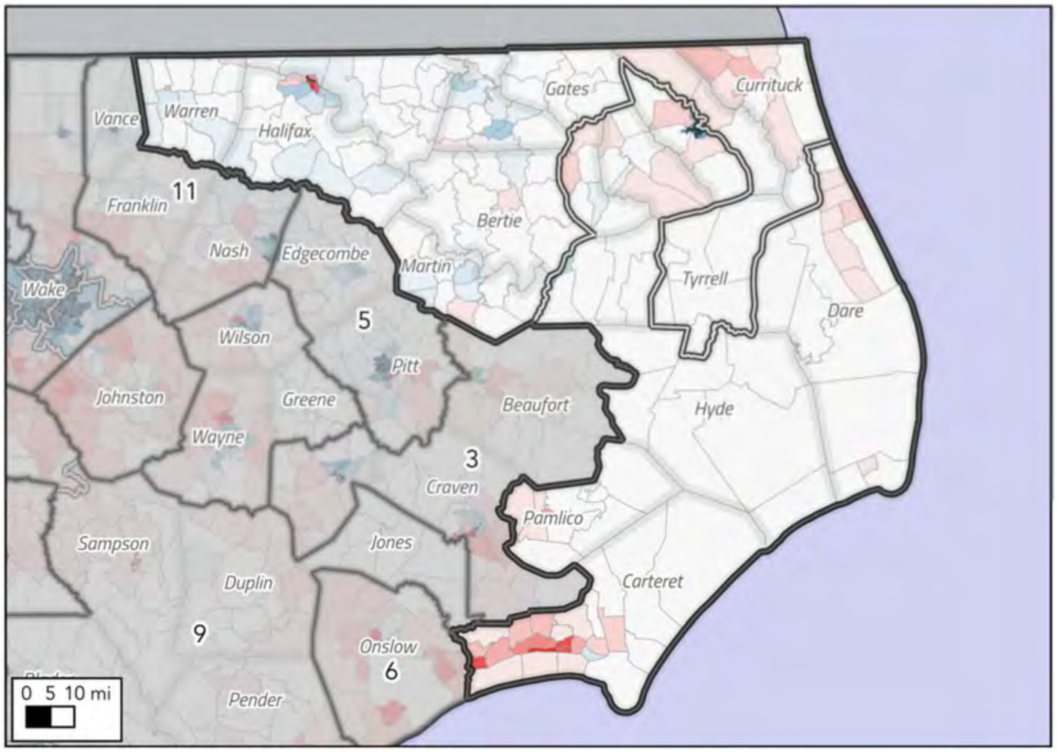
Senate districts 1 and 2 are located in two adjacent county clusters that contain Bertie, Halifax, Hertford, Northampton, and Warren counties. Many of these counties are among the most racially diverse in the state.

The mapmakers had one consequential choice to make here—the choice of which counties would be included within each cluster (the size of each cluster is such that the clusters can contain only one district, each). The choice of cluster helped tilt the scales in the direction of the Republican Party, as evidenced in Maps 28 and 29 below. If the map-drawers had chosen the alternative county cluster configuration (Map 29), the result would have been much more likely to favor the Democratic Party in one district (with a projected CCSC score of D+10,270) and the Republican Party in the other district (with a projected CCSC score of R+49,916). Instead, the enacted map pairs more Republican voters together resulting in two districts that lean towards the Republican Party (SD-1: R+2, R+16,350; SD-2: R+4, R+23,296), despite the competitiveness of most of the VTDs in this cluster.

Map 28. VTD CCSC for the Northeastern County Clusters



Map 29. Potential Northeastern County Clusters That Were Not Selected



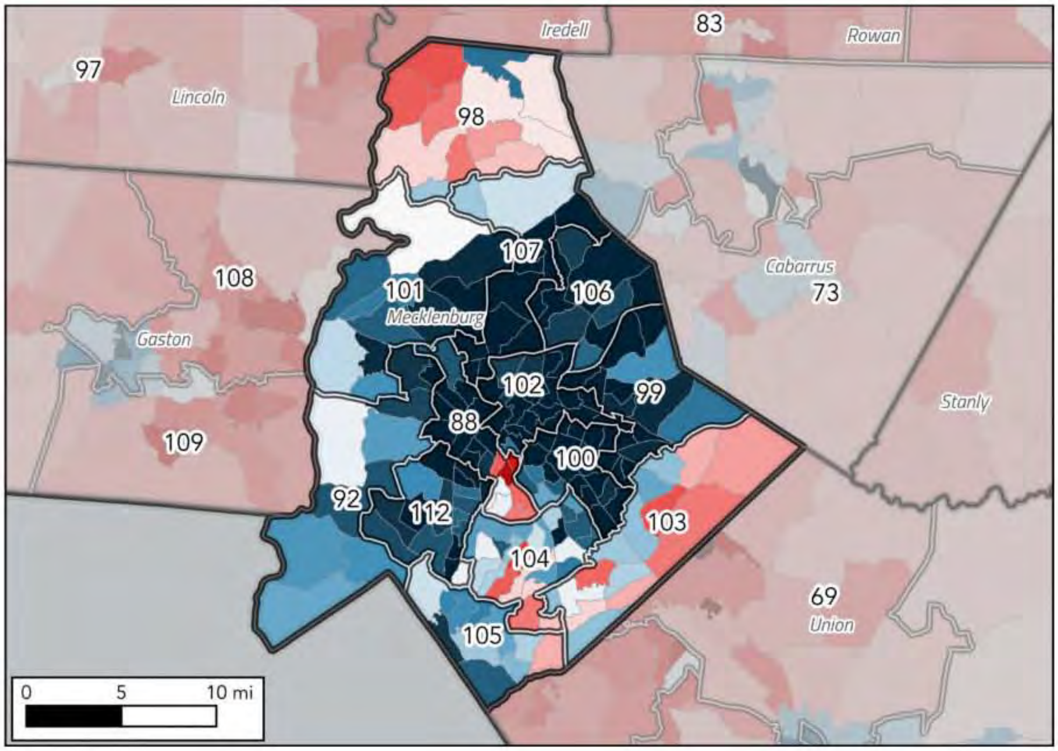
House Districts

HDs 88, 92, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, and 112: Mecklenburg County Cluster

Mecklenburg County is the home of Charlotte as well as six other municipalities. As noted above, Mecklenburg County is dominated by Democratic voters and is becoming even more so as the county continues to grow in population.

The enacted map places no Republican VTDs in HDs 92, 99, 100, 101, 102, 106, 107, and 112, leaving every Republican-leaning VTD in HDs 88, 103, 104, and 105. This arrangement provides Republican candidates the greatest probability of victory possible in this sea of blue. In particular, HDs 98 and 103 are carved out of the pockets of Republican voters in the north and southeast portions of the county so as to be particularly favorable to Republicans. HD-98 is rated by CPI as R+5 and HD-103 is rated as even, with CCSC scores of R+4,359 and R+2,645, respectively.

Map 30. VTD CCSC for the Mecklenburg County Cluster



HDs 11, 21, 33, 34, 35, 36, 37, 38, 39, 40, 41, and 49: Wake County Cluster

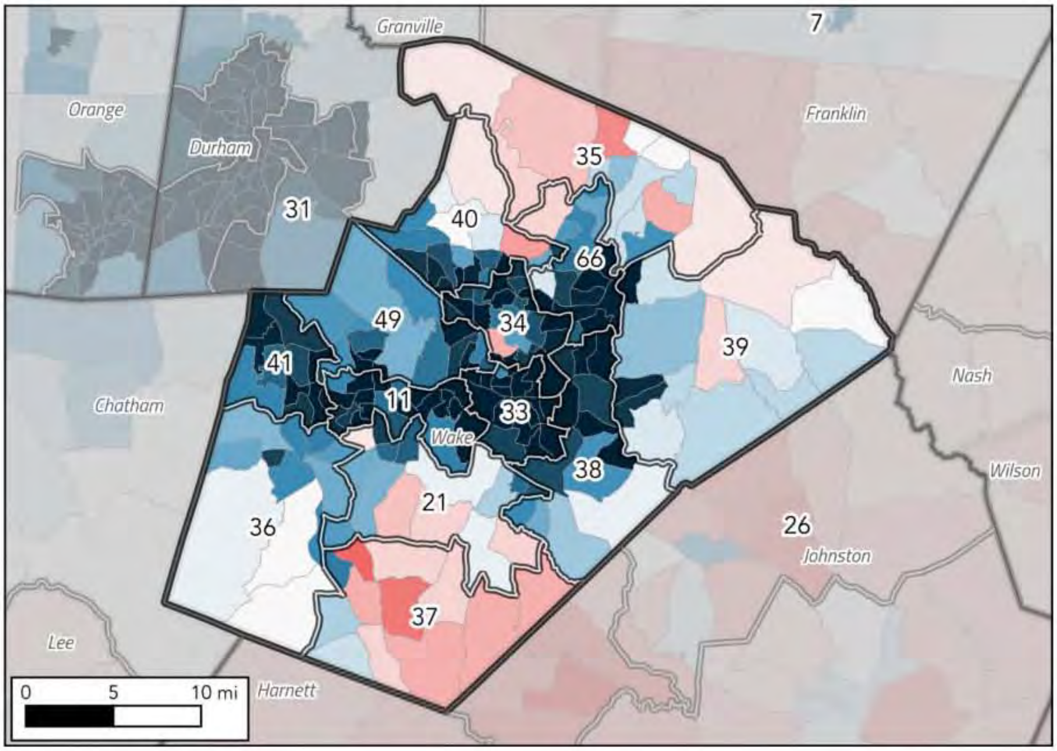
House districts 11, 21, 33, 34, 35, 36, 37, 38, 39, 40, 41, and 49 are located in the Democratic stronghold of Wake County, which includes Raleigh and 11 other municipalities. As noted above, Wake County gave 63.5% of its two-party vote share to Joe Biden in 2020 and supported Democratic candidates for every statewide office. There are no Republicans on the county commission.

The enacted map packs Democrats into as few districts as possible, creating contorted districts that, in the case of HDs 11, 33, 36, 38, 41, and 49, include no Republican VTDs. This leaves HD-37 as a Republican leaning district, which will benefit the Republican candidate Erin Pare, who narrowly defeated a Democrat in the last election. These district boundaries also increase the probability that a Republican can defeat the Democratic incumbent Terence Everitt in HD-35, in the northern portion of Wake County. HD-37 is rated as R+3 by the CPI and has a R+6,400 score; HD-35 is rate as R+1 by the CPI and has a R+2,264 CCSC score.

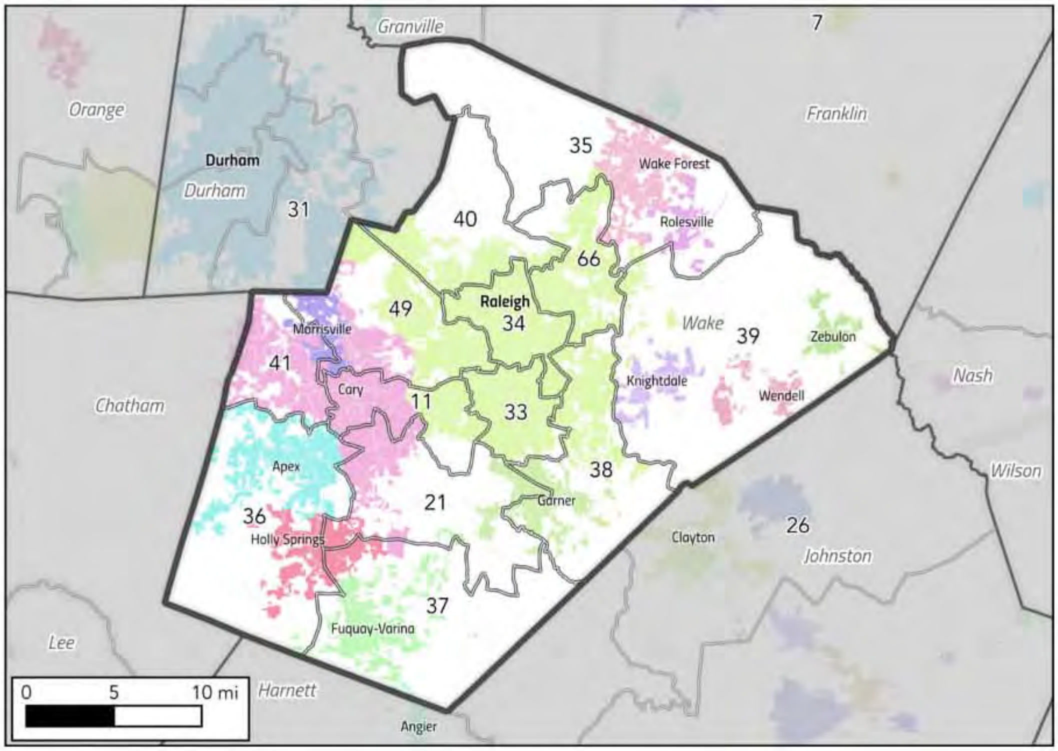
The partisan effects of small decisions are particularly apparent in the spike that juts up from HD-66 into HD-35, keeping the Democratic VTDs in that spike fenced off from the more Republican-leaning VTDs in HD-35. If the district lines took a slightly different jog here, it would increase the probability of Everitt securing re-election.

As Map 32 indicates, the enacted map also splits a number of cities both large (Raleigh, shaded in light green, split across nine districts; Cary, shaded in pink, split across four districts) and small (Garner, Fuquay-Varina, Apex, Holly Springs, and Morrisville). The district boundaries appear calculated to provide a partisan advantage for Republican candidates rather than adhere to any municipal boundaries.

Map 31. VTD CCSC for the Wake County Cluster



Map 32. Municipal Splits in the Wake County Cluster

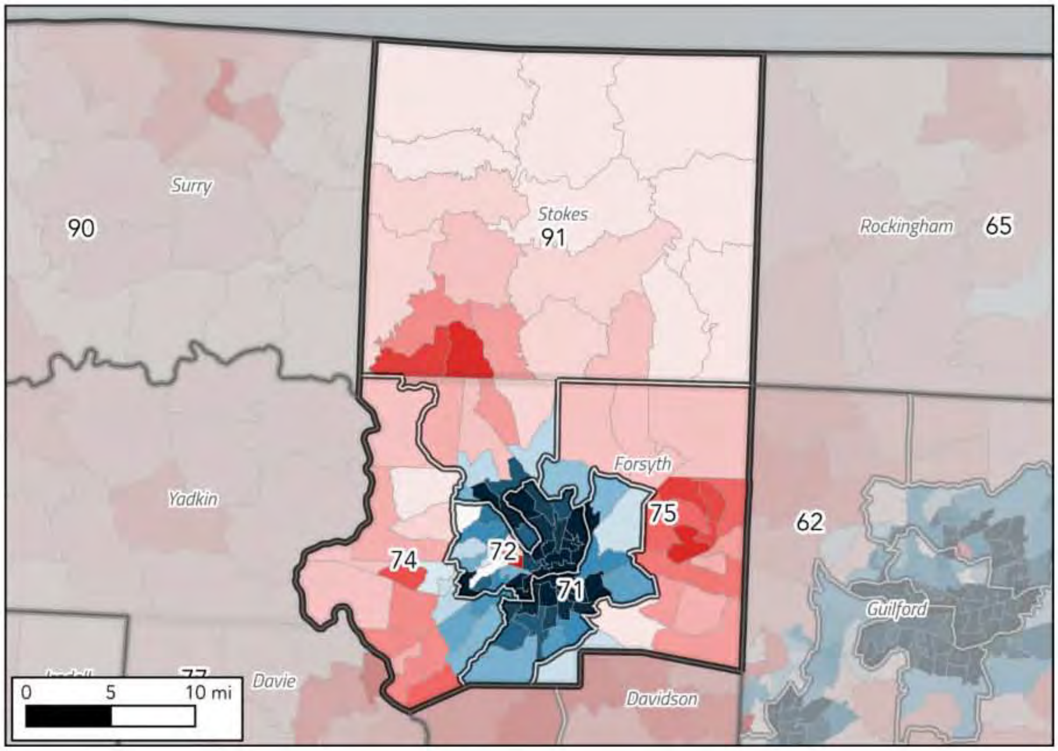


HDs 71, 72, 74, 75, and 91: Forsyth and Stokes County Cluster

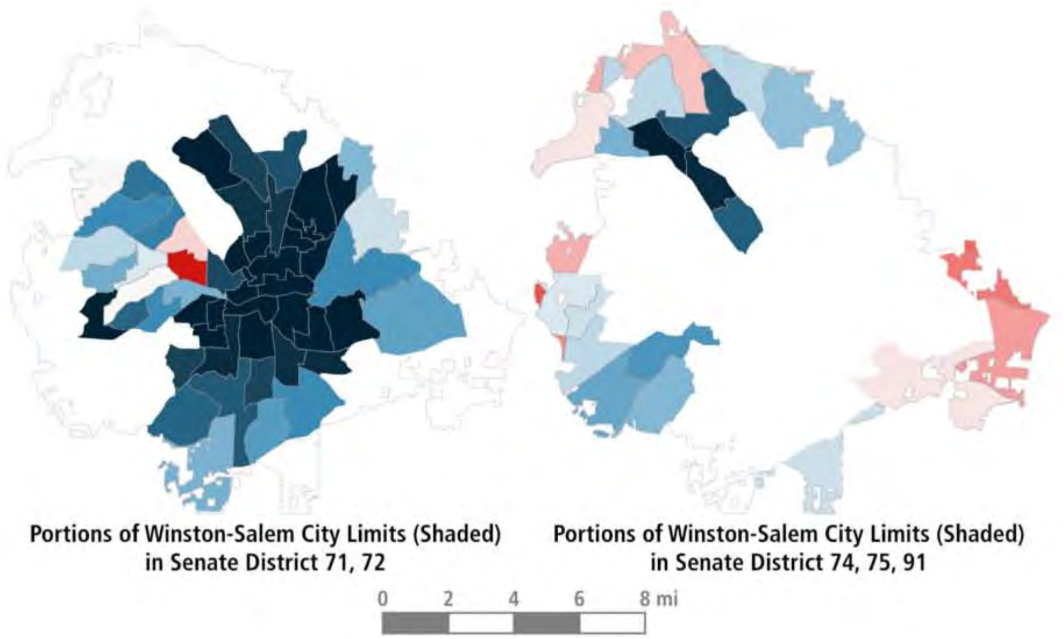
House districts 71, 72, 74, 75, and 91 are located in Forsyth and Stokes counties. The enacted map splits Winston-Salem across all five districts in this cluster and packs Democratic voters into HDs 71 and 72 (HD-71 does not include a single Republican VTD), leaving HD-75 and HD-91 almost certain to elect a Republican and HD-74 as a Republican leaning district (with a CPI score of R+3 and a CCSC score of R+7,846).

The splits of Winston-Salem do not make sense without reference to the anticipated voting behavior of the VTDs arranged into each district. For example, HD-91 includes all of Republican-leaning Stokes County, but instead of joining Stokes with a broader expanse of northern Forsyth County to create a more compact district, HD-91 juts down into the center of Winston-Salem, picking up some of the most Democratic VTDs in the cluster (which include Bethabara Moravian Church, Arts Council Theatre, and Mision Hispana VTDs—43.8% of the population in the latter VTD identifies as black and 29.5% identifies as Hispanic), ensuring that Democratic voters in the core of Winston-Salem have essentially no chance at electing a member of their own party, and dividing a major North Carolina city unnecessarily. But this arrangement does allow HD-74, to the west, and HD-75, to the east, to lean in favor of Republican candidates, despite their proximity to the deep pocket of Democratic voters in the city that those districts overlap with on their outer edges.

Map 33. VTD CCSC for the Forsyth and Stokes County Cluster



Map 34. Detail of Winston-Salem Splits



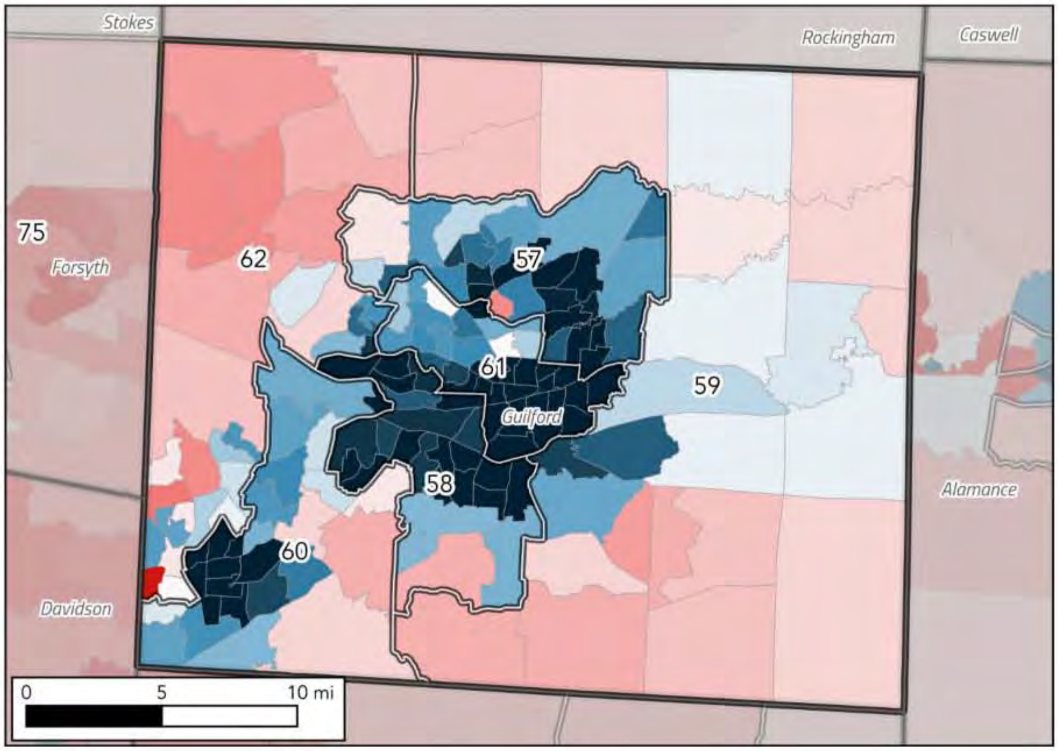
HDs 57, 58, 59, 60, 61, and 62: Guilford County Cluster

HDs 57, 58, 59, 60, 61, and 62 are all contained within the Democratic stronghold of Guilford County, which contains Greensboro and High Point. As noted above, Guilford County voters have provided Democratic candidates large margins of victory in recent state- and county-wide elections.

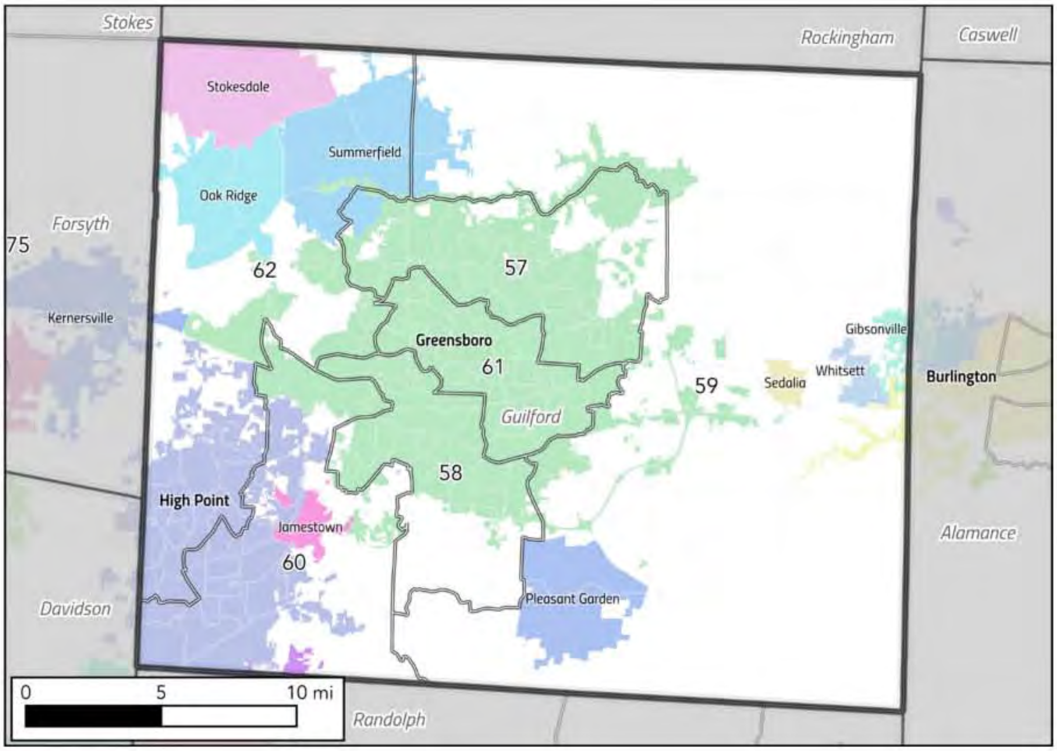
The enacted map packs Democratic voters into HDs 57, 58, 60, and 61. By studiously avoiding the Democratic leaning VTDs in the center of the county, HD-59 creates a reverse C shape that pieces together the southern and northern VTDs in an arrangement that creates district rated as R+2 by CPI, with a R+4,794 CCSC score. Meanwhile, HD-62 rests on the western edge of the county and includes pieces of both Greensboro and High Point, while avoiding the most Democratic areas of these cities. HD-62 is rated by the CPI as R+5 and has a CCSC score of R+11,030.

The enacted map splits Greensboro across all six districts and splits the city of High Point across two districts and Summerfield across three districts (*see* Map 36).

Map 35. VTD CCSC for the Guilford County Cluster



Map 36. Municipal Splits in the Guilford County Cluster



HDs 114, 115, and 116: Buncombe County Cluster

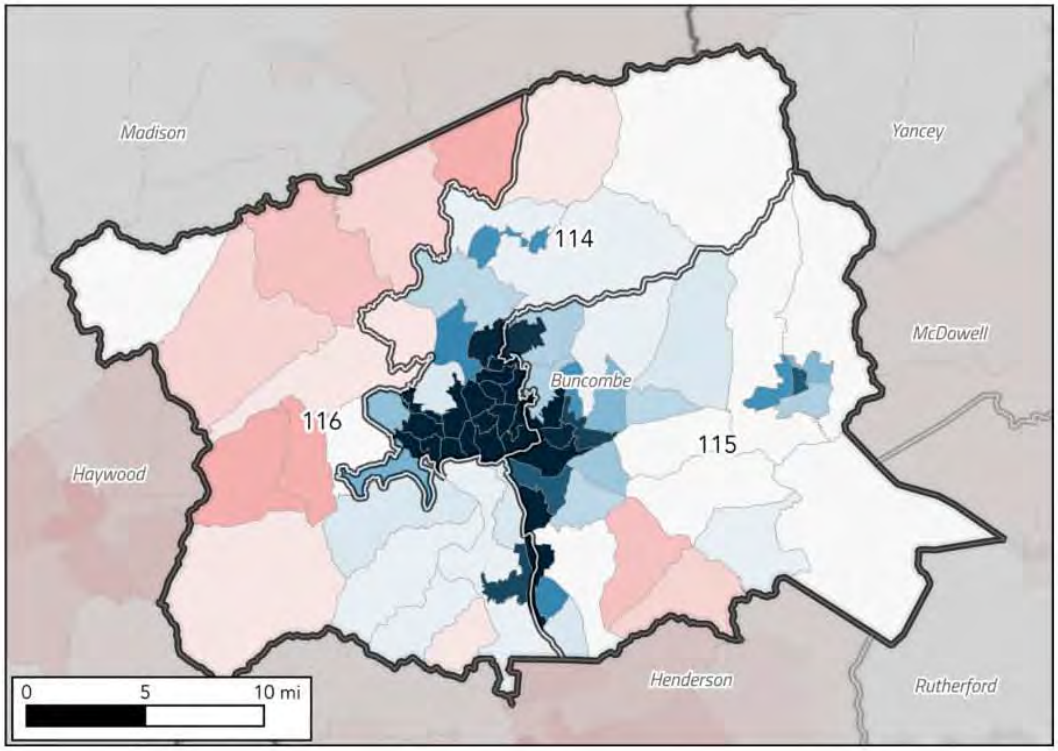
Buncombe County is located in Western North Carolina. It is anchored by Asheville, but also includes five other municipalities—Montreat, Biltmore Forest, Black Mountain, Woodfin, and Weaverville. Due to the *Stephenson* rule, Buncombe County is a single county cluster that must include three districts. Within the county, however, there were a number of choices the map-drawers had before them.

Buncombe is an overwhelmingly Democratic county and has been trending more Democratic each year. In 2020, 60.7% of the county's two-party vote share went to Joe Biden, the 10th highest in the state. Buncombe voters voted for the Democratic candidate in every county-wide contest in 2021 and Buncombe's county commission includes only one Republican.

In both the current map and the enacted map, Buncombe County includes HDs 114, 115, and 116. All three districts are currently represented by Democrats, with Susan Fisher in HD-114, John Ager in HD-115, and Brian Turner in HD-116. By shifting the current district lines where the districts meet in Asheville, however, the enacted map packs as many Democrats as possible into HD-114, while HD-115 stays relatively constant in terms of predicted vote share. The C-shaped HD-116 now includes most of the Republican-leaning VTDs in Buncombe, transforming it from a safely Democratic district into a district that leans towards the Republican Party (HD-116 is rated by CPI as R+3 and has a CCSC score of R+5,800).

The enacted map also places the pocket of overwhelmingly white voters of Biltmore Forest in the competitive HD-116, while the traditionally African American community of Shiloh to the east is left in HD-115. Soon after the maps were passed, all three Democratic incumbents announced that they would be retiring and not running for office in these newly drawn districts.

Map 37. VTD CCSC for the Buncombe County Cluster

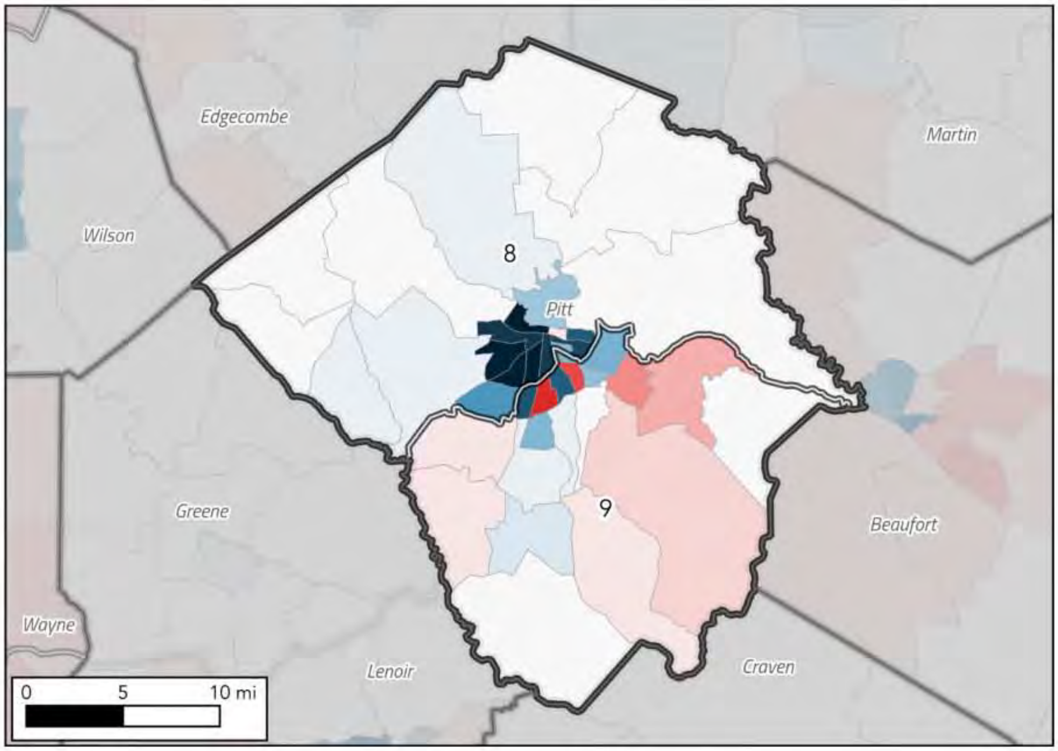


HDs 8 and 9: Pitt County Cluster

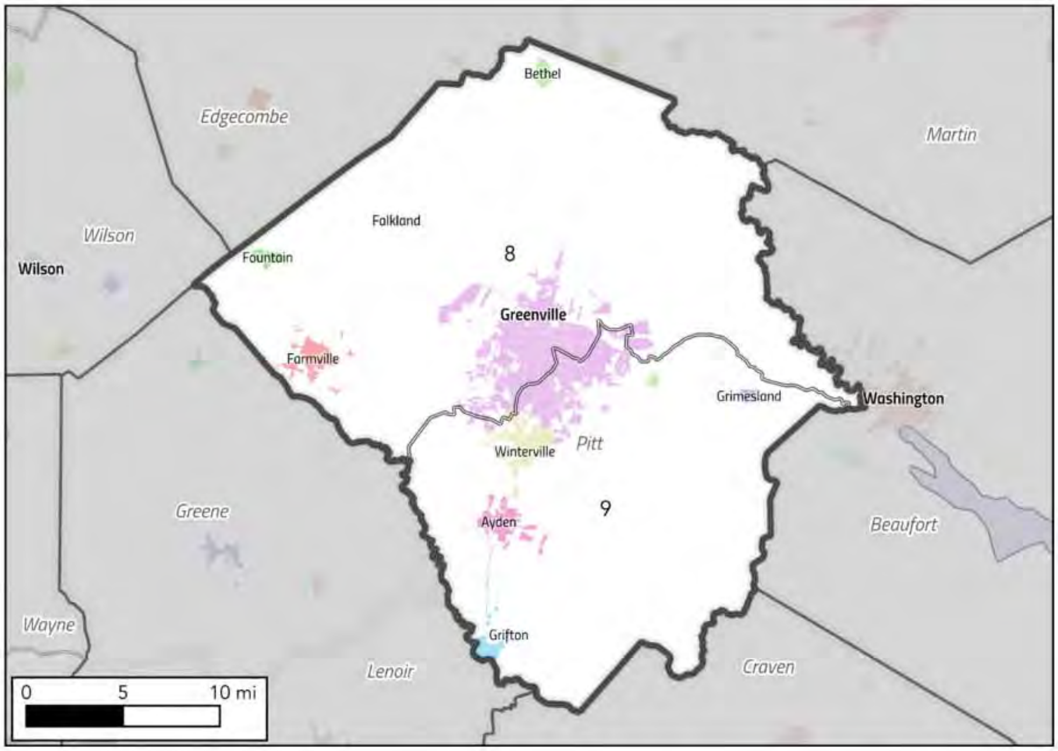
HD 8 and 9 are located in Pitt County, a county that gave 55% of its vote share to Joe Biden in the 2020 election, making it the 19th most Democratic county in the state according to this metric. The county is currently represented by two Democrats: Kandie Smith in HD-8 and Brian Farkas in HD-9.

By splitting Greenville at a particularly consequential location, the enacted map packs most Democrats in that city into HD-8 and fences them off from two Republican-leaning VTDs in HD-9. This particular division of Greenville makes HD-8 a much safer seat for Democrats and allows for a Republican-leaning district in Farkas' HD-9, which is rated by the CPI as R+3 and has a CCSC score of R+4,503. These district boundaries are difficult to explain with reference to communities of interest or natural geography. For example, students in East Carolina University's College of Health and Human Performance would take classes in HD-9, while their residence halls would be in HD-8. Similarly, as students walked from the ECU Hill District to Dowdy-Ficklen Stadium on Saturdays to watch the Pirates, they would be entering not only a sea of purple-clad football fans, but a different House district as well.

Map 38. VTD CCSC for the Pitt County Cluster



Map 39. Municipal Splits in the Pitt County Cluster

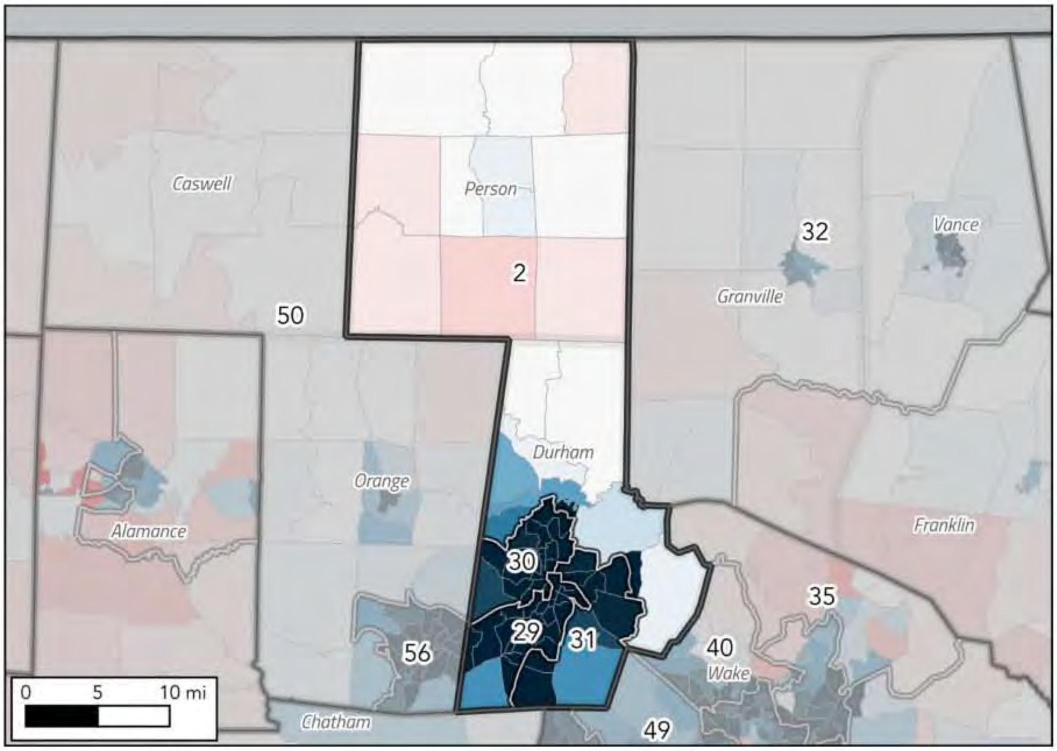


HDs 2, 29, 30, and 31: Durham and Person County Cluster

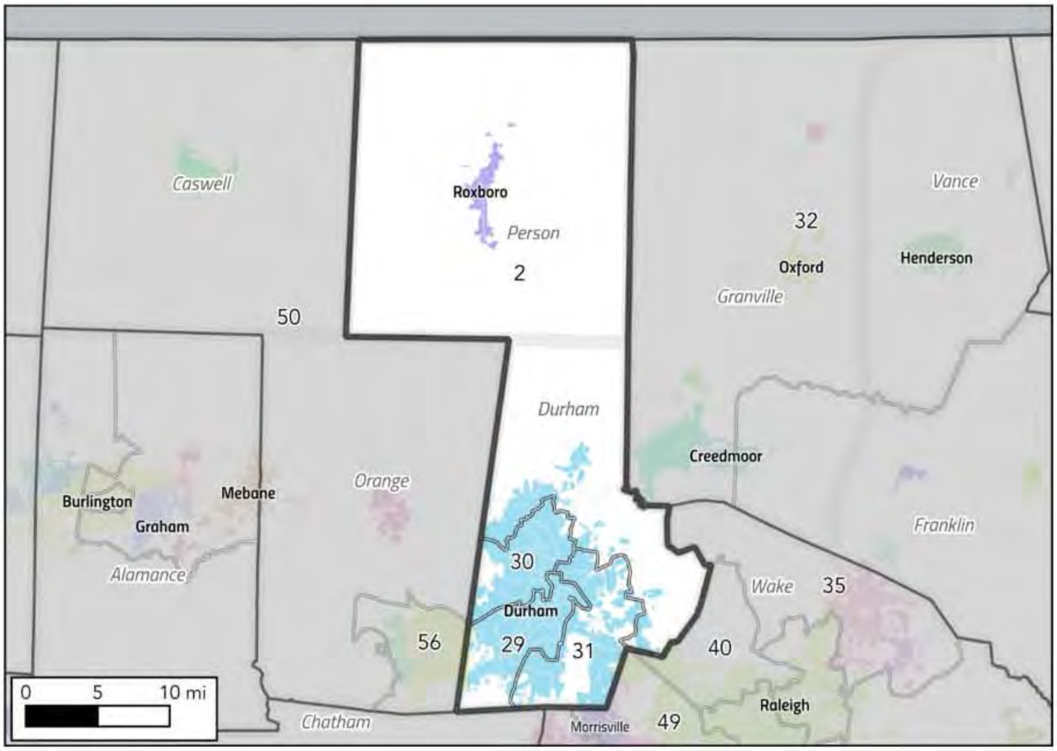
House districts 2, 29, 30, and 31 are located in a cluster with Durham and Person counties. While Person County leans towards the Republican Party, Durham County is the most Democratic county in the state, by almost any metric. Durham County gave 81.6% of its two-party vote share to Joe Biden in the 2020 election and voted overwhelmingly for Democratic candidates in every county-wide election.

The enacted map splits the City of Durham across all four districts but packs Democratic voters in HDs 29, 39, and 31; there is not a single Republican or competitive VTD in those districts. Meanwhile, HD-2 grabs all of the less Democratic and more competitive VTDs within Durham County, studiously avoiding the darkest blue VTDs in the northern end of the City of Durham. The result of these district boundaries that pack Democratic voters in the three districts in the south of Durham County is a claw-shaped appendage that allows HD-2 to be as competitive for the Republican Party as possible, giving the Republican incumbent a chance in this largely blue cluster.

Map 40. VTD CCSC for the Durham and Person County Cluster



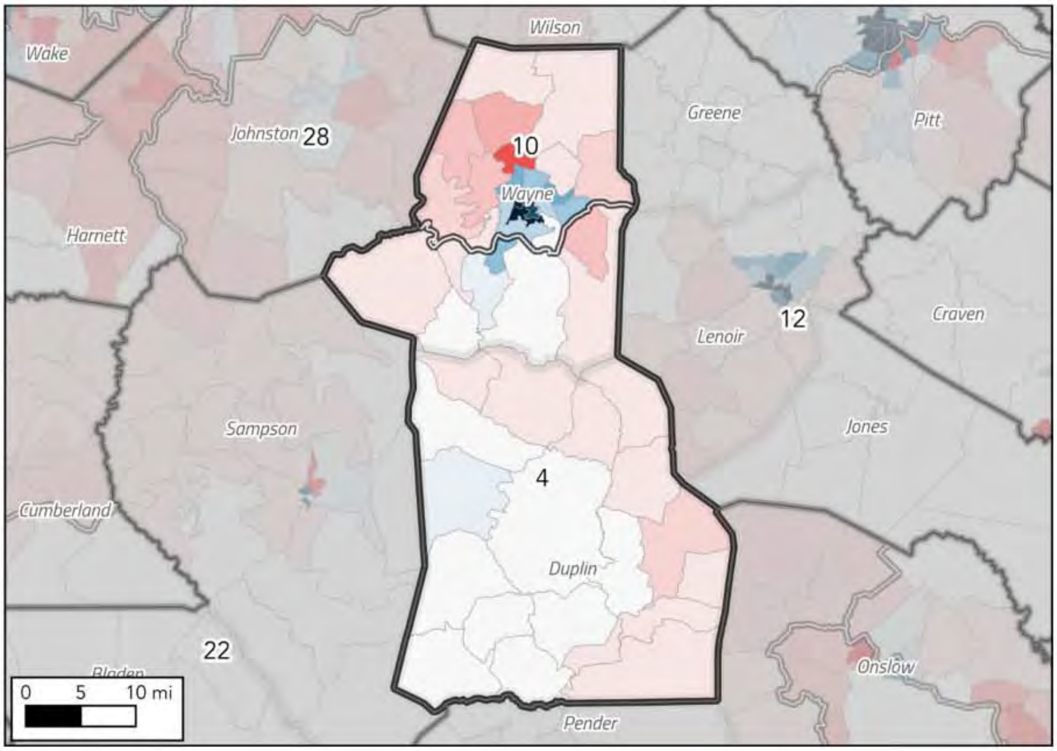
Map 41. Municipal Splits in the Durham and Person County Cluster



HDs 4 and 10: Duplin and Wayne County Cluster

House districts 4 and 10 are located in Duplin and Wayne counties, southeast of Wake County. The district boundary that runs through Wayne County ensures that there will be two Republican districts. HD-4 is rated R+8 by the CPI and advantages the Republican Party by 14,079 votes, according to the CCSC. HD-10 is rated R+3 by the CPI, with a R+4,951 CCSC advantage.

Map 42. VTD CCSC for the Duplin and Wayne County Cluster

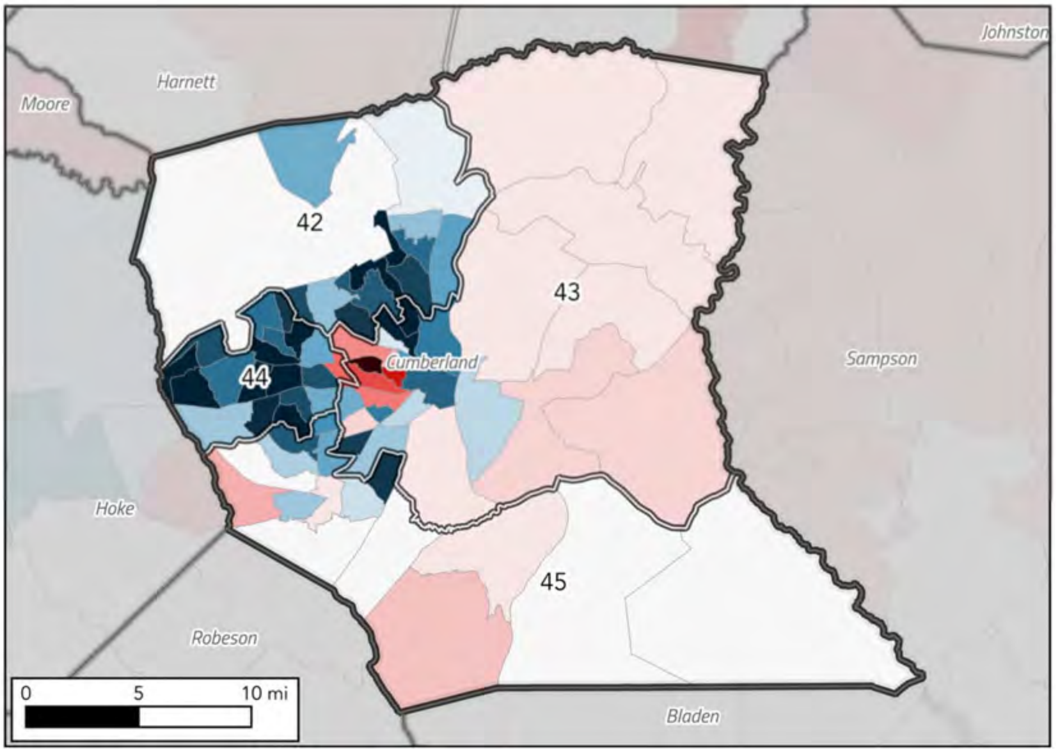


HDs 42, 43, 44, and 45: Cumberland County Cluster

Cumberland County is a heavily Democratic county, home to Fayetteville. Cumberland gave 58% of its two-party vote share to Joe Biden in 2020 and has not given the plurality of its votes for President to a Republican since 2004.

The enacted map creates two extremely competitive districts, HD-43 and HD-45 (with CCSC scores of D+1,334 and D+663, respectively) by splitting the Democratic-leaning City of Fayetteville into all four districts in the cluster. HD-43 picks up the most Republican VTDs in Fayetteville in a pattern that has partisan implications, making that district more competitive for first-term incumbent Republican Diane Wheatley. The district boundaries are also potentially confusing to voters. A citizen driving north on The All American Freeway would, in the span of about 3.5 miles, move from HD-43 to HD-44, then split the border between HD-43 and HD-44, then back into HD-44, form the border between HD-44 and HD-42, then move fully into HD-42. HD-45 includes the Republican and competitive VTDs on the south side of the county and moves into Fayetteville, but narrowly avoids the most Democratic-leaning VTDs in the city.

Map 43. VTD CCSC for the Cumberland County Cluster

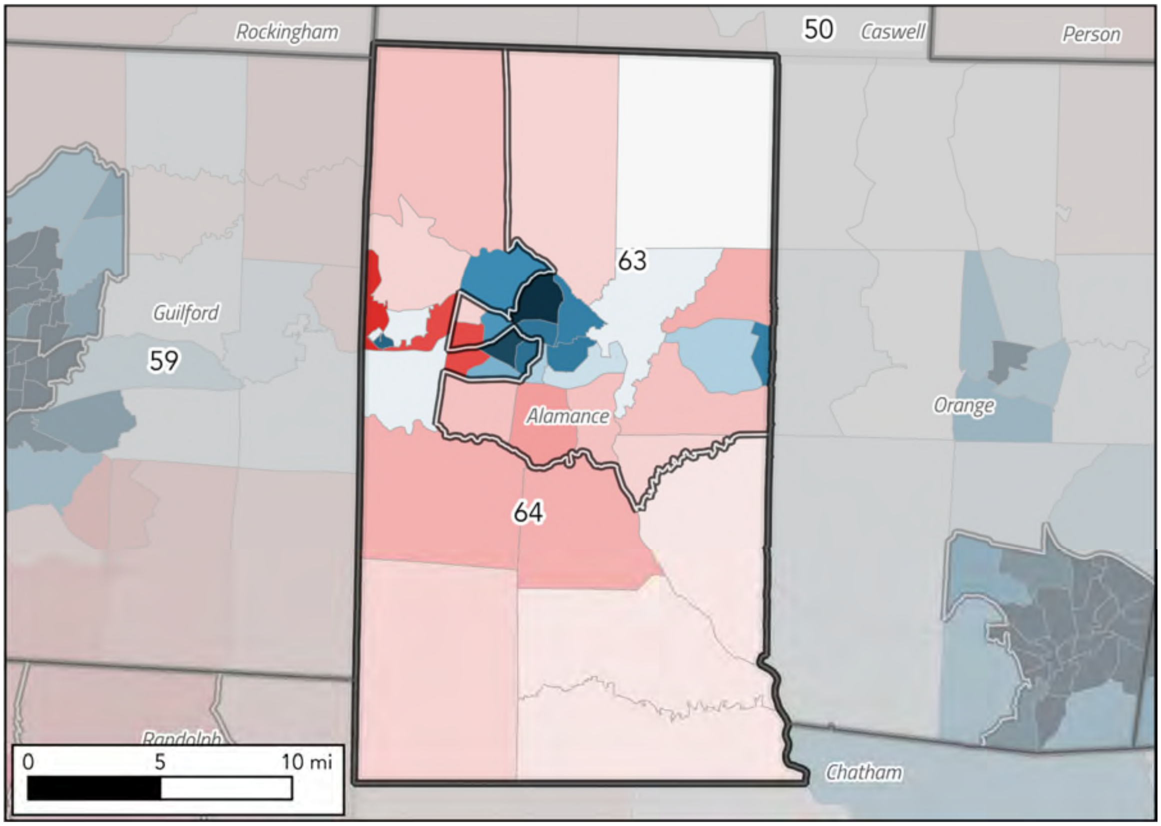


HDs 63 and 63: Alamance County Cluster

Alamance County is located between Guilford and Orange counties and includes the municipalities of Burlington, Graham, Mebane, Elon, Gibsonville, Green Level, Haw River, Ossipee, Swepsonville, and Alamance. The enacted map creates a heavily Republican HD-64 (R+8, R+13,572) and a competitive HD-63 (D+1, D+1,877) that could be challenging for the re-election of Democrat Ricky Hurtado, the only Latino legislator in North Carolina's General Assembly.

The enacted map takes a series of odd jogs around the City of Burlington in which three heavily Democratic VTDs are drawn into the heavily Republican HD-64, thus reducing the influence of those voters and leaving them walled off from HD-63 where they would be more likely to make a difference in the electoral outcome in a close district. This dovetail pattern does not follow municipal boundaries or other traditional communities of interest. At one point, the gap created between HD-63 and HD-64 is a mere three blocks wide.

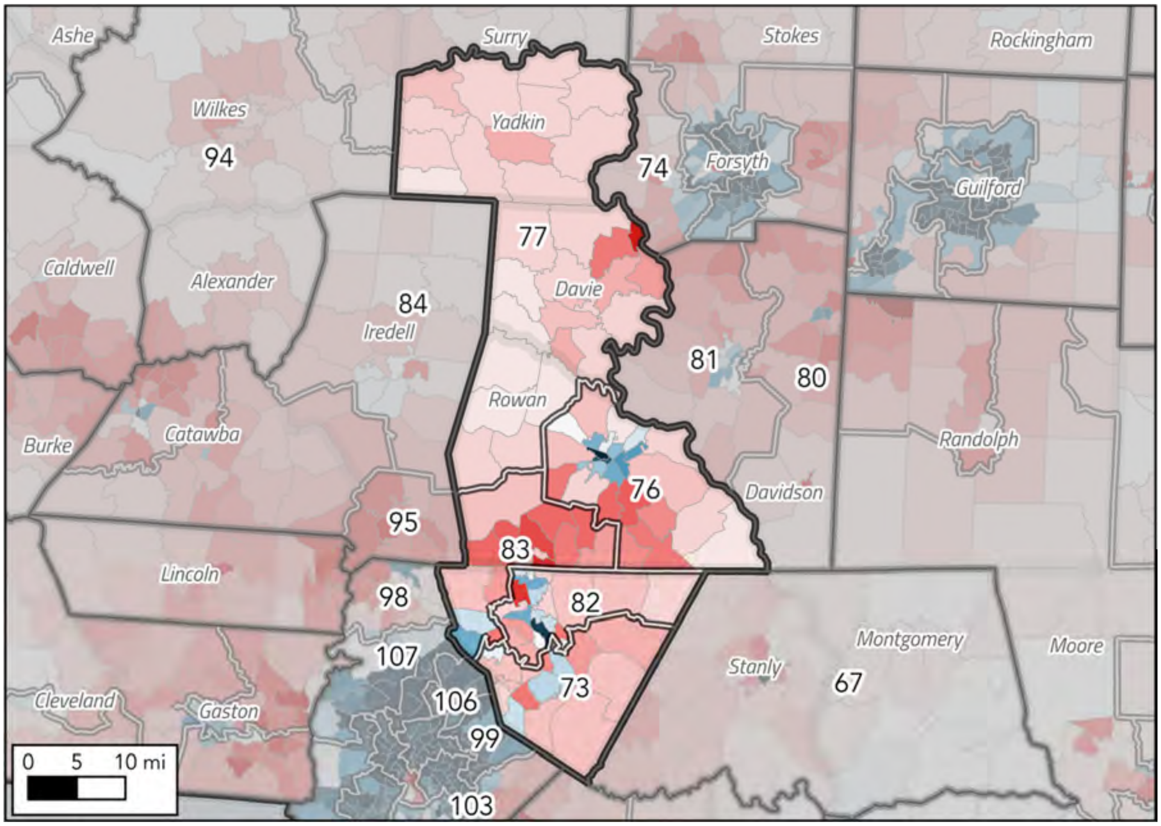
Map 44. VTD CCSC for the Alamance County Cluster



HDs 73, 76, 77, 82, and 83: Cabarrus, Davie, Rowan, and Yadkin County Cluster

This cluster is located northeast of Mecklenburg County. While the composition of these counties suggests that Republicans are likely to have an advantage in some of the potential districts in this cluster, the enacted map creates five Republican districts, ranging from a CPI of R+3 and CCSC score of R+5,578 to a CPI of R+25 and CCSC score of R+51,128. HD-82, which includes Concord and Kannapolis and is the most competitive district in the cluster as drawn, conspicuously excludes Democratic VTDs near the northeastern border of Mecklenburg County, which are placed in HDs 83 and 73.

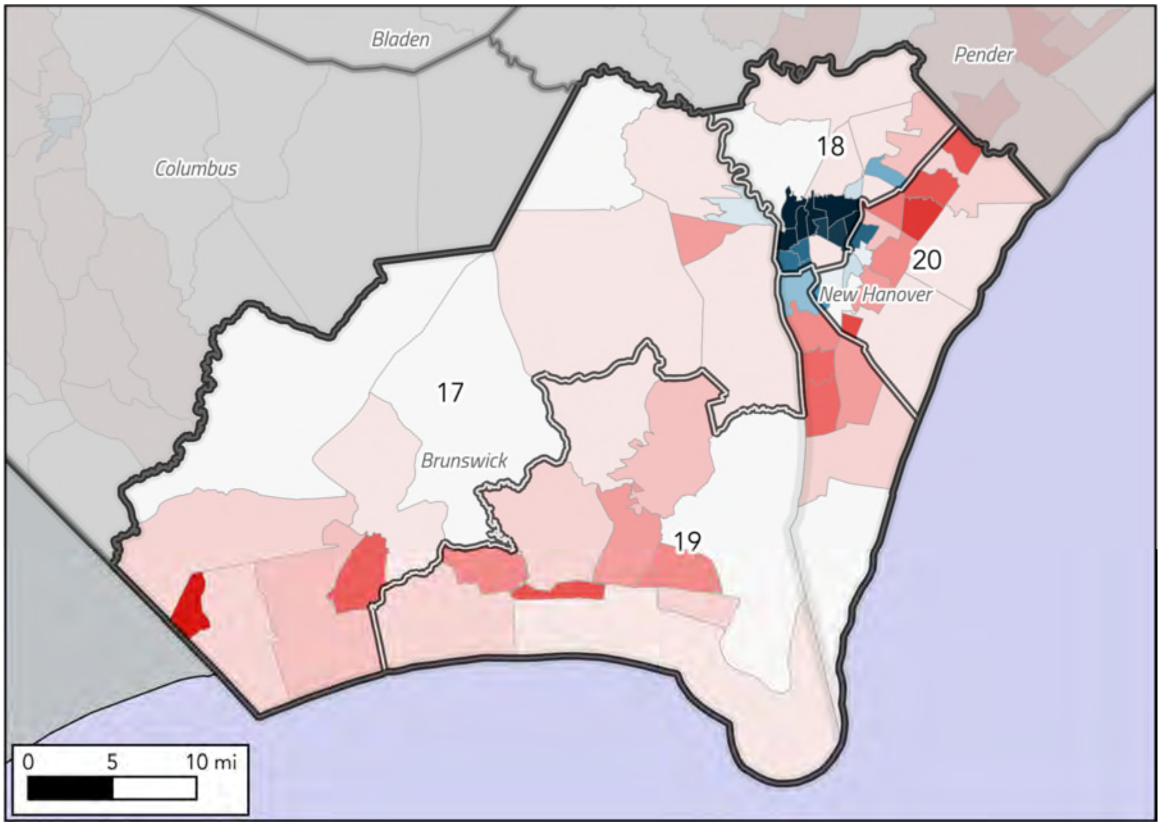
Map 45. VTD CCSC for the Cabarrus, Davie, Rowan, and Yadkin County Cluster



HDs 17, 18, 19, and 20: Brunswick and New Hanover County Cluster

The Brunswick-New Hanover cluster is located in eastern North Carolina and includes four House districts. Three of the four (HD-17, HD-19, and HD-20) lean towards the Republican Party, while HD-18 (D+11, D+20,338) packs Democratic voters in and around Wilmington, making the adjacent HD-20 (R+3, R+7,728) more competitive. The heavily Republican HD-19 also ensnares a Democratic-leaning VTD south of Wilmington, which keeps that VTD out of competitive HD-20.

Map 46. VTD CCSC for the Brunswick and New Hanover County Cluster



Conclusion

After analyzing the characteristics of all three maps as a whole, as well as the characteristics of each district in isolation, it is clear that the enacted maps will increase the number of Republicans in Congress and in the General Assembly, while decreasing the number of Democrats. Democratic voters in the vast majority of the congressional districts will have no chance at representation from a member of their own party and Republican voters in the congressional districts that pack Democrats will have no chance of representation from a member of their own party. Democratic voters are similarly disadvantaged in the Senate and House county clusters addressed above. This is not a result of natural packing or geographic clustering, but rather because the map-makers drew district lines in ways that, taken together, benefit the Republican Party. Not only do the enacted maps artificially create a substantial partisan advantage for which there is no apparent explanation other than gerrymandering, but the enacted maps also unnecessarily split communities of interest and will alter representational linkages in ways that, in some cases, have never been seen in North Carolina's history.

Christopher A. Cooper

Attachment A

December, 2021

Christopher A. Cooper

EDUCATION

Ph.D., University of Tennessee, Political Science (2002)

M.A., University of Tennessee, Political Science (1999)

B.A., Winthrop University, Political Science and Sociology (1997)

ACADEMIC POSITIONS

Madison Distinguished Professor (July 2019-Present)

Professor of Political Science and Public Affairs, Western Carolina University (2014-Present)

Associate Professor of Political Science and Public Affairs, Western Carolina University (2008-2014)

Associate Professor of Psychology (by Courtesy), Western Carolina University (2011-present)

Faculty Fellow, Institute for the Economy and the Future Western Carolina University (2002-2006)

Assistant Professor of Political Science and Public Affairs, Western Carolina University (2002-2008)

ADMINISTRATIVE POSITIONS

Director, Public Policy Institute, Western Carolina University (July 2008-July 2011; July 2021-present)

Department Head, Department of Political Science and Public Affairs, Western Carolina University (July 2012-July 2021; Interim from July 2011-June 2012)

Director, Master of Public Affairs (M.P.A.) Program, Western Carolina University (2005-2010)

INTERNATIONAL TEACHING

Guest Lecturer, Ludwigsburg University of Education, Ludwigsburg, Germany (May, 2018)

Guest Lecturer, Middelburg Center for Transatlantic Studies, Middelburg, the Netherlands (December, 2009; June 2012)

AWARDS

North Carolina Professor of the Year, Carnegie Foundation for the Advancement of Teaching (2013)

Board of Governors Teaching Award, WCU (2013)

University Scholar, WCU (2011)

Chancellor's Award for Engaged Teaching, WCU (2007)

Teaching-Research Award, WCU (2006)

Outstanding Achievement—Teaching, Service Learning Department (2005)

Oral Parks Award for the best faculty paper presented at the 2003 meeting of the North Carolina Political Science Association.

Artinian Professional Development Grant, Southern Political Science Association (2004; 2006)

Provost's Citation for Extraordinary Professional Promise, University of Tennessee (2002)

ADDITIONAL TRAINING

Social Network Analysis course through the Inter-university Consortium for Political and Social Research, Chapel Hill, NC (2010)

Spit Camp, Salimetrics, Inc, State College, PA (2010)

Deliberative Polling Institute, Stanford University (2008)

Hierarchical Linear Model course through the Inter-university Consortium for Political and Social Research, Amherst, MA (2005)

Summer Institute in Experimental Methods, Yale University (2003)

CATI and Ci3 training (2003)

Summer Institute in Political Psychology, Ohio State University (1999)

RESEARCH

BOOKS [2]

Cooper, Christopher A., and H. Gibbs Knotts. 2017. *The Resilience of Southern Identity*. Chapel Hill: University of North Carolina Press.
[Featured in the Durham Herald-Sun, Charleston City Paper, Statehouse Report (SC), Blue Ridge Public Radio (Asheville, NC), WFAE (Charlotte, NC), South Carolina Public Radio (Walter Edgar's Journal), WUNC (The State of Things), Georgia Public Radio (On Second Thought), Reviewed in the *Journal of Southern History*]

Cooper, Christopher A., and H. Gibbs Knotts, eds. 2008. *The New Politics of the Old North State*. Chapel Hill, NC: University of North Carolina Press.
[Featured in *Raleigh News and Observer*, Reviewed in *Journal of Southern History*, *North Carolina Historical Review*]

JOURNAL ARTICLES (PEER REVIEWED)
 # DENOTES STUDENT CO-AUTHOR

Cooper, Christopher A. "Innumeracy and State Legislative Salaries." *Public Opinion Quarterly*. 85(1): 147-160.

[Media coverage: Kate Elizabeth Queram; "Voters Have No Clue How Much State Lawmakers Make." Route Fifty. Sept 9, 2021. Jeremy Borden's Untold Story; Under the Dome Podcast (Sept 10); John Boye, "Paltry Pay for State Legislators is Embarrassing—and bad for Democracy." *Asheville Citizen Times*. December 4, 2021]

Cooper, Christopher A., Scott Huffmon, and H. Gibbs Knotts, and Seth McKee. 2021. "Heritage v. Hate: Assessing Opinions in the Debate Over Confederate Monuments and Memorials." *Social Science Quarterly*. 102(3): 1098-1110.

[Media coverage: This Week in South Carolina (SCETV)]

Cooper, Christopher A., M.V. Hood III, Scott Huffmon, Quintin Kidd, H. Gibbs Knotts, and Seth McKee. 2020. Switching Sides but Still Fighting the Civil War in Southern Politics. *Politics Groups, and Identities*.

Cooper, Christopher A. 2020. "Maybe They're Not So Different After All: The Uniform Effects of Personality on Job Satisfaction Among Government and Non-Government Workers." *Journal of Public and Nonprofit Affairs*. 6(1): 63-78.

Cooper, Christopher A. and John D. Gerlach. 2019. "Diversity Management in Action: Chief Diversity Officer Adoption in America's Cities." *State and Local Government Review*. 51(2): 113-121

Reinagel, Tyler, and Christopher A. Cooper. 2019. "Assessing the State of Mandatory Fees in America's Public Colleges and Universities: Causes and Consequences." *Social Science Quarterly* 101(2): 427-438.

Menickelli, Justin, Christopher A. Cooper, Chris Withnall, and Michael Wonnacott. 2019. "Analysis and Comparison of Lateral Head Impacts Using Various Golf Discs and a Hybrid III Head Form." *Sports Biomechanics*. 18(6).

Cooper, Christopher A., and H. Gibbs Knotts. 2019. "Do I Have to Take The GRE? Standardized Testing in MPA Admissions. *PS: Political Science & Politics*." 52(3): 470-475..

Cooper, Christopher A., H. Gibbs Knotts, and James Bourne#. 2018. "When the Personal Vote Isn't Enough: Voter Mobilization and the Failed Effort to Change the Form of Government in Columbia, SC." *Journal of Public and Nonprofit Affairs*. 4(3): 251-264.

Cooper, Christopher A. Cooper. "Not Just for Oprah Anymore: Incorporating Book Clubs Into Political Science Classes." *Journal of Political Science Education*.

Amira, Karyn, Christopher A. Cooper, H. Gibbs Knotts, and Claire Wofford. 2018. "The Southern Accent as a Heuristic in American Campaigns and Elections." *American Politics Research*. 46(6): 1065-1093.

[News Coverage: *Charleston Post and Courier* "Dang it! Politicians with Southern Accents seen as less honest, less intelligent."; PsyPost, "Candidates with a Southern accent are views more negatively—even in the South."; *US News and World Report; Charleston City Paper*]

Cooper, Christopher A. and Tyler Reinagel. 2017. "The Limits of Public Service Motivation: Confidence in Government Institutions Among Public Servants." *Administration and Society* 49(9): 1297-1317.

– Ex. 10991 –

Chaffin, Latasha, Christopher A. Cooper, and H. Gibbs Knotts. 2017. "Furling the Flag: Explaining the 2015 Legislative Vote to Remove the Confederate Flag in South Carolina." *Politics and Policy*. 45: 944-963.

Cooper, Christopher A. Whittney Bridges#, and David M. McCord. 2017. "Personality and the Teaching of Public Administration: A Case for the Big Five." *Journal of Public Affairs Education*. 23: 677-690.

Cooper, Christopher A., H. Gibbs Knotts, and Jordan Ragusa. 2016. "The Constrained Governor? Gubernatorial Decision-Making on U.S. Senate Appointments." *Political Research Quarterly*. 69: 482-494.

Collins, Todd A., and Christopher A. Cooper. 2016. "The Case Salience Index, Public Opinion and Decision Making on the U.S. Supreme Court." *Justice System Journal*. 37: 232-245.

Menickelli, Justin, David Barney, Dan P. Grube, and Christopher A. Cooper. 2016. Disc Golf and Walking Benefits: A Pedometer Based Physical Activity Assessment. *International Journal of Physical Education, Fitness and Sports*. 5(1): 1-5.

Collins Todd A., and Christopher A. Cooper. 2015. "Making the Cases Real: Media Coverage of the U.S. Supreme Court." *Political Communication*. 32(1): 23-42

Cooper, Christopher A., and H. Gibbs Knotts. 2014. "Partisan Composition in Southern State Legislatures." *Southern Cultures*. 20: 75-89.
[Listed as One of *Southern Cultures*' "Top Ten Classroom Reads."]

Cooper, Christopher A., Dale Carpenter, Audrey Ranier,# and David M. McCord. 2014. "Personality and Job Satisfaction: Evidence from a Sample of Street Level Bureaucrats." *International Journal of Public Administration*. 37: 155-162.

Cooper, Christopher A., and H. Gibbs Knotts. 2013. "Overlapping Identities in the American South." *Social Science Journal*. 50: 6-12.

Cooper, Christopher A., Alan Socha# and Lauren Golden#. 2013. "The Big Five Personality Factors and Mass Politics." *Journal of Applied Social Psychology*. 43: 68-82.

Cooper, Christopher A., H. Gibbs Knotts, David M. McCord, and Andrew Johnson# 2012. "Taking Personality Seriously: The Five Factor Model and Public Administration." *American Review of Public Administration*. 43(3): 397-415.

Collins, Todd A., and Christopher A. Cooper. 2012. "Case Salience and Media Coverage of Supreme Court Decisions: Toward a New Measure." *Political Research Quarterly*. 65: 396-407.

Cooper, Christopher A., and H. Gibbs Knotts. 2012. "The Changing Relationship Between Race and Region: Opinions Towards Southerners from 1964 to 2008." *Social Science Quarterly*. 93: 58-75.

Cooper, Christopher A., H. Gibbs Knotts, and Katy Elders#.. 2011. "The Geography of Social Identity in Appalachia." *Southeastern Geographer*. 51: 457-472.

Bowen, Glenn, Carol Burton, Christopher A. Cooper, Laura Cruz, Anna McFadden, and Chesney Reich. 2011. "Listening to the Voices of Today's Undergraduates: Implications for Teaching and Learning. *Journal of the Scholarship of Teaching and Learning.*

Cooper, Christopher A., David McCord, and Alan Socha[#]. 2011. "Reassessing the College Sophomore Problem: The Case of Personality and Politics. *Journal of Psychology: Interdisciplinary and Applied.* 145:23-37.

Cooper, Christopher A., H. Gibbs Knotts and C. Don Livingston. 2010. "Regional Identity and Policy Choice." *Journal of Appalachian Studies.* 26-41.

Cooper, Christopher A., and H. Gibbs Knotts. 2010. "Rethinking the Boundaries of the South." *Southern Cultures.* Winter: 72-88.
[Featured in the *Washington Post.* Steve Hendrix, "D.C. Area and Dixie Drifting Farther and Farther Apart." Jan. 16 2011; Tracy Thompson, "Dixie is Dead." The Bitter Southerner Blog http://bittersoutherner.com/dixie-is-dead-tracy-thompson-defining-the-south/#.VW32TM7YmM4 ; Editorial, "Whistling Dixie, or Not." *Roanoke Times.* July 12, 2020]

Collins, Todd A., Christopher A. Cooper, and H. Gibbs Knotts. 2010. "Scholarly Productivity in Non-PhD Departments." *PS: Political Science and Politics.* 43: 509-514.

Socha, Alan[#], Christopher A. Cooper, and David M. McCord. 2010. "Confirmatory Factor Analysis of the M5-50: An Implementation of the IPIP Item Set." *Psychological Assessment.* 22: 43-49.

Cooper, Christopher A., and H. Gibbs Knotts. 2010. "Declining Dixie: Regional Identification in the Modern American South." *Social Forces.* 88(3) 1083-1102.

Cooper, Christopher A., and H. Gibbs Knotts. 2009. "Public Opinion on Land Use Planning." *Popular Government.* Fall: 24-28.

Cooper, Christopher A., and Martin Johnson. 2009. "Representative Reporters? Journalists and Media Bias in Context." *Social Science Quarterly.* 90: 387-406.

Cooper, Christopher A., H. Gibbs Knotts, and Moshe Haspel. 2009. "The Content of Political Participation: Letters to the Editor and the People Who Write Them." *PS: Political Science and Politics.* 42: 131-137.
[Featured in the *Raleigh News and Observer.* Ted Vaden. "Do Letters Reflect Regular Opinion?" October 8, 2006"]

Cooper, Christopher A., Moshe Haspel and H. Gibbs Knotts. 2009. "The Importance of Voterfiles for State Politics Research." *State Politics and Policy Quarterly.* 9: 102-121.

Cooper, Christopher A. 2008. "Reassessing Conference Goals and Outcomes: A Defense of Presenting Identical or Similar Papers at Multiple Conferences." *PS: Political Science and Politics.* 41: 293-296.

Brennan, Kathleen, and Christopher A. Cooper. 2008. "Rural Mountain Natives, In-Migrants, and the Cultural Divide." *Social Science Journal.* 45: 279-295.

Cooper, Christopher A., H. Gibbs Knotts, and Kathleen Brennan. 2008. "Trust in Government, Citizen Competence, and Public Opinion on Zoning." *Public Administration Review.* 68(3): 459-468.

Cooper, Christopher A., Anthony J. Nownes, and Martin Johnson. 2007. "Interest Groups and Journalists in the States." *State Politics and Policy Quarterly.* 7: 39-53.

[Reprinted in John R. Baker, ed. 2009. *The Lanahan Readings in State and Local Government: Diversity, Innovation, and Rejuvenation, 2nd Edition*. Lanahan Publishing.]

Cooper, Christopher A., and H. Gibbs Knotts. 2006. "Region, Race and Support for the South Carolina Confederate Flag." *Social Science Quarterly*. 87: 142-154.

Cooper, Christopher A., and Lilliard E. Richardson. 2006. "Institutions and Representational Roles in U.S. State Legislatures." *State Politics and Policy Quarterly*. 6: 174-194.

Richardson, Lilliard E., and Christopher A. Cooper. 2006. "E-mail Communication and Target Groups in US State Legislatures." *Policy Studies Journal*. 34: 113-129.

Cooper, Christopher A., Anthony J. Nownes, and Steven Roberts. 2005. "Perceptions of Power: Interest Groups in Local Politics." *State and Local Government Review*. 37: 206-216.
[Reprinted in John R. Baker, ed. 2009. *The Lanahan Readings in State and Local Government: Diversity, Innovation, and Rejuvenation, 2nd Edition*. Lanahan Publishing.]

Cooper, Christopher A., and Anthony J. Nownes. 2004. "Money Well Spent: An Experimental Investigation of the Effects of Advertorials on Citizen Opinion." *American Politics Research*. 32: 546-569.

Richardson, Lilliard E., Brian E. Russell, and Christopher A. Cooper. 2004. "Legislative Representation in a Single-Member Versus Multi-Member District System: The Arizona State Legislature." *Political Research Quarterly*. 57: 337-344.

Cooper, Christopher A., and H. Gibbs Knotts. 2004. "Defining Dixie: A State Level Measure of the Modern Political South." *American Review of Politics*. 25: 25-40 (Special Issues on Southern Politics).

Cooper, Christopher A. 2004. "Internet Use in the State Legislature." *Social Science Computer Review*. 22: 347-354.

Cooper, Christopher A., and Anthony J. Nownes. 2003. "Citizen Groups in Big City Politics." *State and Local Government Review*. 35: 102-111.

Cooper, Christopher A. 2002. "Media Tactics in the State Legislature." *State Politics and Policy Quarterly*. 2: 353-371.

Cooper, Christopher A. 2002. "E-Mail in the State Legislature: Evidence From Three States." *State and Local Government Review*. 34: 127-132.

Cooper, Christopher A. and Marc Schwerdt. 2001. "Depictions of Public Service in Children's Literature: Revisiting an Understudied Aspect of Political Socialization." *Social Science Quarterly*. 82: 614-630.

BOOK CHAPTERS

Cooper, Christopher A., and H. Gibbs Knotts. 2022. "Reliably Purple: The 2020 Presidential Election in North Carolina." In David Schultz and Rafael Jacob, eds. *Presidential Swing States, Third Edition*. Lexington Press.

Cooper, Christopher A., and H. Gibbs Knots. 2018. "North Carolina: Still Swingin' in the South." In David Schultz, and Rafael Jacob, eds. *Presidential Swing States, Second Edition*. Lexington Press.

Cooper, Christopher A., and H. Gibbs Knotts. 2015. "The Bluest Red State in America: North Carolina as a Swing State." In David Schultz and Stacy Hunter Hecht, eds. *Presidential Swing States: Why Only Ten States Matter*. Lexington Press.
[Recommended by *Choice*]

Cooper, Christopher A., and Mandi Bates. "Entertainment Media and Political Knowledge: Do People Get Any Truth out of Truthiness?" 2008. In Joseph Foy, ed., *Laughing Matters: Humor in American Politics*. University Press of Kentucky. Paperback edition published in 2010.
[Reviewed in the *New York Post* Aug. 2, 2008]

Cooper, Christopher A. "Multimember Districts and State Legislatures." 2008. In Bruce Cain, Todd Donovan, and Caroline Tolbert, eds. *Electoral Reform in the United States*. Brookings Institution Press.

Cooper, Christopher A. 2008. "The People's Branch: The North Carolina State Legislature." In *The New Politics of the Old North State*, ed. Christopher A. Cooper, and H. Gibbs Knotts. Chapel Hill: UNC Press.

Cooper, Christopher A, and H. Gibbs Knotts. 2008. "Traditionalism and Progressivism in the Old North State." In *The New Politics of the Old North State*, ed. Christopher A. Cooper, and H. Gibbs Knotts. Chapel Hill: UNC Press.

Cooper, Christopher A, and H. Gibbs Knotts. 2008. "Rethinking Progressivism and Governance in the Old North State." In *The New Politics of the Old North State*, ed. Christopher A. Cooper, and H. Gibbs Knotts. Chapel Hill: UNC Press.

Cooper, Christopher A., and H. Gibbs Knotts. 2004. "Packaging the Governor: Television Advertising in the 2000 Elections." In *Lights, Camera, Campaign! Media, Politics, and Political Advertising*, ed. David Schultz. Peter Lang Publishing: 101-120.

Cooper, Christopher A. and Anthony J. Nownes. 2002. "Textiles, Traditions and Scandal: Money in South Carolina Politics." In *Laboratories of Democracy: Money in State Politics*, ed. David Schultz. Durham: Carolina Academic Press: 133-154.

ENCYCLOPEDIA AND HANDBOOK ENTRIES

Cooper, Christopher A. 2008. "Multi-Member Districts." In the *Political Encyclopedia of the US States and Regions*, edited by Donald P. Haider-Markel, Michael Card, Keith Gaddie, Gary Moncrief, and Kenneth Palmer. Washington DC: CQ Press.

Cooper, Christopher A. 2008. "State Senator." In the *Encyclopedia of American Government and Civics*, edited by Michael A. Genovese and Lori Cox Han. New York; Facts on File.

Cooper, Christopher A., and Brian Noland. 2004. "Lobbying the Executive Branch." In *Research Guide to U.S. and International Interest Groups*, ed. Clive Thomas. Westport, CT: Praeger Press: 176-178.

EXPERT & TECHNICAL REPORTS

Cooper, Christopher, Blake Esselstyn, Gregory Herschlag, Jonathan Mattingly, and Rebecca Tippett. 2021. NC General Assembly County Clusterings from the 2020 Census. August 17. https://sites.duke.edu/quantifyinggerrymandering/files/2021/08/countyClusters2020.pdf

Cooper, Christopher, Blake Esselstyn, Gregory Herschlag, Jonathan Mattingly, and Rebecca Tippett. 2021. Legislative Clustering in North Carolina: Looking Towards the 2020 Census. July 16. https://sites.duke.edu/quantifyinggerrymandering/files/2021/07/Legislative-County-Clustering-in-North-Carolina.pdf

Cooper, Christopher A. 2020. Declaration of Christopher A. Coper, PhD. Submitted in National Urban League v. DeJoy. Case No. 1:20-cv-023971-GLR. September 2020.

Cooper, Christopher A. 2019. Rebuttal Report of Christopher A. Cooper, PhD. Submitted in Common Cause V. Lewis. 18: VCS 014001. June 7, 2019.

Cooper, Christopher A. 2019. Expert Report of Christopher A. Cooper, PhD. Submitted in Common Cause V. Lewis. 18: VCS 014001. April 8, 2019.

Cooper, Christopher A. *Survey Results for the Opt-In Process*. 2014. *Opt-In Survey Results*. Southwestern Regional Planning Commission/Appalachian Regional Commission.

Brennan, Kathleen, Christopher A. Cooper, and Inhyuck "Steve" Ha. 2014. *Regional Outlook Report, 2014*. Western Carolina University.

Cooper, Christopher A., H. Gibbs Knotts and Billy Hutchings[#]. 2010. *Public Opinion on the Town Square Property*. Report Prepared for the Town of Black Mountain based on original survey and focus group data.

Cooper, Christopher A., and Thomas Jones[#]. 2010. *Yancey County Schools Health Assessment Report.* Report Prepared for the Yancey County School District based on original survey data.

Cooper, Christopher A. 2008. *Citizen Satisfaction in Buncombe County, NC.* Report Prepared for Buncombe County based on original survey data.

Brennan, Kathleen, Christopher A. Cooper, and Inhyuck "Steve" Ha. 2008. *Regional Outlook Report, 2008*. Institute for the Economy and the Future, Western Carolina University.

Cooper, Christopher A., and Sarah Kehrberg[#]. 2007. *Yancey County Schools Health Assessment Report.* Report Prepared for the Yancey County School District based on original survey data.

Cooper, Christopher A., and Alison Melnikova[#]. 2006. *Citizen Satisfaction in Sylva, NC.* Report Prepared for the Town of Sylva based on original survey data.

Ha, Inhyuck, Kathleen Brennan, Christopher Cooper, Chester Pankowski, and Jay Denton. 2005. *The Impact of Western Carolina University on the Regional Economy*. Center for Regional Development, Western Carolina University.

Brennan, Kathleen, Christopher A. Cooper, and Inhyuck Ha. 2004. *Regional Outlook Report, 2004*. Center for Regional Development, Western Carolina University.

PUBLIC-FACING WRITING (OP-EDS, MAGAZINE PIECES, BLOGS, ETC.) [+ REGULAR CONTRIBUTIONS TO OLDNORTHSTATEPOLITICS.BLOGSPOT.COM)

Cooper, Christopher A. "Want Your vote to Count? Don't Ignore 2021. *Asheville Citizen Times.* October 17, 2021

Cooper, Christopher A. "State Legislators Make Big Decisions. So Why do They Get Tiny Paychecks? New Research Uncovered One Surprising Reason" The Monkey Cage/A Washington Post Blog. September 8, 2021. https://www.washingtonpost.com/politics/2021/09/08/state-legislators-make-big-decisions-so-why-do-they-get-tiny-paychecks/

Cooper, Christopher A. "Getting What We Pay For." *The Assembly* February 23, 2021. https://www.theassemblync.com/short-form/getting-what-we-pay-for/

Cooper, Christopher A. "Georgia, North Carolina, and the Illusion of 'Turning Blue.'" *Asheville Citizen Times.* February 7, 2021.

Cooper, Christopher A. "Eliminate Literacy Test from the NC Constitution." *Asheville Citizen Times.* January 10, 2021. Also appeared in the *Raleigh News and Observer.* January 17, 2021.

Cooper, Christopher A. "Election 2020 in Summary: Different Inputs, Similar Outputs." *Asheville Citizen Times.* November 23, 2020.

Cooper, Christopher A. "Absentee-by-Mail Balloting in North Carolina: The Mouse that Roars." Asheville Citizen Times. October 23, 2020.

Cooper, Christopher A. "NC Voters: Don't Ignore the Bottom of the Ballot." *Asheville Citizen Times.* September 29, 2020.

Cooper, Christopher A. "Keeping the Youth Vote Alive in a Time of Uncertainty." *Asheville Citizen Times.* September 7, 2020.

Cooper, Christopher. North Carolina's close Senate race is a puzzle in a purple state. *London School of Economics US Centre's American Politics and Policy Blog.* August 25, 2020. https://blogs.lse.ac.uk/usappblog/2020/10/21/north-carolinas-close-senate-race-is-a-puzzle-in-a-purple-state/

Cooper, Christopher. Why North Carolina may be one of the most important states in the 2020 election. *London School of Economics US Centre's American Politics and Policy Blog.* August 25, 2020. https://bit.ly/31qCgMi

Cooper, Christopher A. "In the World of North Carolina Politics and Beyond, What's Old is New Again." *Asheville Citizen Times.* August 8, 2020.

Cooper, Christopher A., M.V. Hood III, Scott Huffmon, Quintin Kidd, H. Gibbs Knotts, and Seth McKee. Southern Democrats' Split with Republicans over Confederate Symbols is More Recent Than You Might Think. *London School of Economics US Centre's American Politics and Policy Blog.* July 10, 2020.

Cooper, Christopher A. "The NC-11 Runoff: A Sneak Preview of Elections in the Time of Covid-19." *Asheville Citizen Times.* June 20, 2020.

Cooper, Christopher A. "Mark Meadows' Departure Has Opened the Door for a Unique Republican Runoff Election in North Carolina's 11th Congressional District." *London School of Economics US Centre's American Politics and Policy Blog*. June 19, 2020.

Cooper, Christopher A. "Let's end the Political Limbo in NCs 11th District." *Asheville Citizen Times*. May 15, 2020.

Cooper, Christopher A. "A Path to Victory in Bernie's Appalachia." *Asheville Citizen Times*. April 15, 2020.

Cooper, Christopher A. "Putting Runoff Elections in Context." *Asheville Citizen Times*. March 17, 2020.

Cooper, Christopher A. "Taking a Look at Those Online Candidate Quizzes Before Tuesday's Primary." *Asheville Citizen Times*. March 2, 2020.

Cooper, Christopher A. "The Rise of the Unaffiliated Voter." *Asheville Citizen Times*. February 15, 2020.

Cooper, Christopher A. "The Field is Clear: Learning From Candidate Filings in NC." *Asheville Citizen Times*. January 21, 2020.

Cooper, Christopher A. "Looking at 'Swing Counties' in the Swing State of North Carolina" *Asheville Citizen Times*. December, 15 2019.

Cooper, Christopher A. "Want Your Vote for President to Count? You Live in the Right Place" *Asheville Citizen Times*. November 9, 2019.

Cooper, Christopher A. "Don't Put the Cart Before the Horse; We've Got an Election Before 2020" *Asheville Citizen Times*. October 20, 2019.

Cooper, Christopher A. "Stacking the farm-team of future politicians with more female representation." Carolina Commentary. October 9, 2019.

Cooper, Christopher A. "Wisconsin Republicans' Corrupt Power Grab Echoes Republican Efforts in North Carolina in 2016." *NBC.com*. December 15, 2018.

Cooper, Christopher A. "Looking Down Ballot" *Asheville Citizen Times*. December 16, 2018.

Cooper, Christopher A. "And Now for Something Completely Different: Good News from the 2018 Elections." *Asheville Citizen Times*. November 19, 2018.

Cooper, Christopher A. "Taking Stock of What We Know Ahead of November 6." *Asheville Citizen Times*. October 20, 2018.

Cooper, Christopher A. "Contextualizing Constitutional Amendments." *Asheville Citizen Times*. September 17, 2018.

Cooper, Christopher A. "November is Coming: What We know—and don't—about How North Carolina Voters Will Lean. *Asheville Citizen Times*. August 26, 2018.

Cooper, Christopher A. "Lessons from Charlotte and the RNC." *Asheville Citizen Times*. July 23, 2018.

Christopher A. Cooper, H. Gibbs Knotts, and Jordan Ragusa. "When appointing a US Senator, governors act responsibly." *Raleigh News and Observer*. June 27, 2018.

Christopher A. Cooper. "The Voter ID Conversation I Wish We Were Having." *Asheville Citizen Times*. June 17, 2018.

Christopher A. Cooper. "North Carolina's Leaving the (Political) Party Behind." *Asheville Citizen Times*. May 20, 2018.

Christopher A. Cooper. "It's Hard to Have Democracy When Voters Have No Choice." *Asheville Citizen Times*. April 22, 2018.

Christopher A. Cooper. "He Zigs, He Zags." *Asheville Citizen Times*. August 2017.

Cooper, Christopher A. 2017. "Prospects for Democrats in the West." Carolina Commentary. August, 2017.

Cooper, Christopher A. "We Need More Women in Office." Asheville Citizen Times. February 22, 2017.

Cooper, Christopher A. "It's Time to Look Down Ballot for Real Impact." Asheville Citizen Times. December 12, 2017.

Cooper, Christopher A. "Provisional Ballots are new Hanging Chads." Asheville Citizen Times. November 18, 2016.

Cooper, Christopher A. "Trump Taught us That Rural Vote Matters." *Asheville Citizen Times*. November 14, 2016.

Cooper, Christopher A. "Election Almost Over; What Have We Learned?" *Asheville Citizen Times*. November 7, 2016.

Cooper, Christopher A, H. Gibbs Knotts, and Jordan Ragusa. "Governors Tend to Appoint Senators who most Resemble Voters in the State, Rather than Ideologues." London School of Economics United States Politics and Policy blog. October 8, 2016.

Cooper, Christopher A. "What to Take Away From Debate Season" Asheville Citizen Times. October 7, 2016.

Cooper, Christopher A. "What Can We Expect in the NC General Assembly Races? Asheville Citizen Times. September 9, 2016.

Cooper, Christopher A. "The Silver Lining May be Hard to See, But It's There." Asheville Citizen Times. August 12, 2016.

Cooper, Christopher A. "Still Swinging: NC Politics in National Context." Asheville Citizen Times. July 8, 2016.

Cooper, Christopher A. "The 2016 Primaries Are Over. What Did We Learn?" Asheville Citizen Times. June 10, 2016.

Cooper, Christopher A. "The Boogeymen in American Politics." Asheville Citizen Times. May 6, 2-16.

Cooper, Christopher A. "Examining the Relationship Between Political Partisanship and HB2." *Asheville Citizen Times*. April 17, 2016.

Cooper, Christopher A. "What Lessons from the 2016 Primary." *Smoky Mountain News*. March 30, 2016.

Cooper, Christopher A. "Thomas Jefferson, Donald Trump, and the Continued Relevance of Political Parties." *Asheville Citizen Times*. March 13, 2016.

Cooper, Christopher A. "Where's the Competition?" *Asheville Citizen Times*. February 14, 2016.

Cooper, Christopher A. "Winning Day is A-coming." *Asheville Citizen Times*. January 10, 2016.

Cooper, Christopher A. And H. Gibbs Knotts "The Confederate Flag Flap: Rapid Policy Change? Yes; Rapid Shift in Public Opinion? No. *Smoky Mountain News*. July 22, 2015.

Cooper, Christopher A. 2015. "Ignore the Polls; Don't Ignore the Endorsements." *Asheville Citizen Times*. June 26, 2015.

Cooper, Christopher A. "What Would the Students Do? Simulating the Work of the General Assembly in Cullowhee." *Asheville Citizen* Times. May 11, 2015.

Cooper, Christopher A. "North Carolina's Close Senate Race is a Puzzling Election in a Purple State." *London School of Economics and Politics Science American Politics Blog* October 21, 2014.

Cooper, Christopher A. "A Good News Story About the Election." *Asheville Citizen Times*. October 19, 2014.

Cooper, Christopher A. "Legislative Salary Increase Proposal Deserves a Chance to be Debated." *Asheville Citizen Times*. June 7, 2014.

Cooper, Christopher A. "Western North Carolina: Where Conservative Democrats Rule." *Asheville Citizen Times*. March 31, 2014.

Cooper, Christopher A., and H. Gibbs Knotts. "NC Counties Shift to Red." *Raleigh News and Observer*. March 14, 2013.

Cooper, Christopher A., and H. Gibbs Knotts. "Important Lessons from the 2012 Election." *Asheville Citizen Times*. November 25, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "Despite Late Night Comedy, Undecided Voters are No Joke." *Asheville Citizen Times*. October 28, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "From Poll Workers to Hanging Chads, Election Details Count." *Charleston Post and Courier*. October 6, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "The Rise of 'Moneyball' Politics." *Asheville Citizen Times*. September 30, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "In Elections, Details Matter." *Asheville Citizen Times*. August 27, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "It's the Economy, Stupid." *Asheville Citizen Times*. July 27, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "Let the Veepstakes Begin." *Asheville Citizen Times*. June 24, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "Thought the Election was Over? Get Ready for the Runoff." *Asheville Citizen Times*. May 27, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "A Closer Look at Same Sex Marriage Amendments." *Asheville Citizen Times*. April 27, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "Examining the Impact of Voter Mobilization in 2012." *Asheville Citizen Times*. March 25, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "With No Incumbent, What Makes a Favorite?" *Asheville Citizen-Times*. February 26, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "Primary Elections About More Than Winners and Losers." *Asheville Citizen-Times*. January 27, 2012.

Cooper, Christopher A., and H. Gibbs Knotts. "Occupy, Tea Party to Help Define 2012 Politics." *Asheville Citizen-Times*. December 21, 2011.

Cooper, Christopher A. and H. Gibbs Knotts. "What to Look for in the 2012 Election Season." *Asheville Citizen Times*. November 25, 2011.

Cooper, Christopher A. and H. Gibbs Knotts. "What do Business Names Say About Asheville?" *Asheville Citizen Times*. August 21, 2011.

Cooper, Christopher A. and H. Gibbs Knotts. "Redistricting 101: An FAQ on a Current Political Issue." *Asheville Citizen Times*. July 17, 2011.

Cooper, Christopher A., and H. Gibbs Knotts. "Be Skeptical of Both Sides in Debate Over N.C. Voter ID Law." *Charlotte Observer*. January 13, 2011.

Cooper, Christopher A., and H. Gibbs Knotts. "County Seats: the GOPs Rise to Parity." *Raleigh News and Observer*. December 8, 2010.

Cooper, Christopher A. "Reflections on the 'Far-Left Leanings' of the 11th Congressional District." *Asheville Citizen Times*. November 11, 2010.

Cooper, Christopher A., and H. Gibbs Knotts. "Conservative Democrats, Endangered Species and Rep. Heath Shuler." *Smoky Mountain News*. July 14, 2010.

Cooper, Christopher A., and H. Gibbs Knotts. "Local Government Doesn't Fare Well in Poll." *Smoky Mountain News*. July 14, 2010.

Cooper, Christopher A., and H. Gibbs Knotts. "Tea Party Catches on, but Impact on Election Still Hard to Gauge." *Smoky Mountain News*. July 14, 2010.

Cooper, Christopher A., and H. Gibbs Knotts. "Assessing the Tea Party Nationally and Locally." *Asheville Citizen Times*. March 2, 2010.

Cooper, Christopher A., and H. Gibbs Knotts. "Look for Opportunities in the Public Arena." *Asheville Citizen-Times*. June 5, 2009.

Cooper, Christopher A., and Thaddeus Huff[#]. "Future NC Leaders Get Valuable Learning Experience." *Asheville Citizen-Times*. May 15, 2009.

Cooper, Christopher A., and H. Gibbs Knotts. "Listening for the Voice of the People." *Durham Herald-Sun*. April 12, 2009.

Cooper, Christopher A., and H. Gibbs Knotts. "Here We Go Again—the 'Z' Word Returns." *Asheville Citizen Times*. April 8, 2009.

Cooper, Christopher A. "Shadowboxing Great for Sports TV, But Bad For Democracy." *Atlanta Journal-Constitution*. November 20, 2008.
[Reprinted in the *Asheville Citizen Times*. November 20, 2008.]

Cooper, Christopher A., and H. Gibbs Knotts. "Making Sense of This Historic 2008 Election." *Asheville Citizen Times*. November 9, 2008.

Cooper, Christopher A., and H. Gibbs Knotts "Survey Reveals Where WCU Students Stand in Presidential Race." *Asheville Citizen Times*. November 2, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "The State of Politics on NC Campuses." *Charlotteobserver.com*. November 1, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "Can Obama Pull off an Upset in the South?" *Asheville Citizen-Times*. October 19, 2008.

Cooper, Christopher, and Gibbs Knotts. "Candidates' Campaign Schedules Finely Tuned." *Asheville Citizen-Times*. September 7, 2008.

Cooper, Christopher, and Gibbs Knotts. "Voters: It's Healthy to Challenge Your Biases." *Asheville Citizen-Times*. July 27, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "Much Ado About Something: Vice-Presidential Selection in the 2008 Election." *Asheville Citizen-Times*. June 15, 2008.

Knotts, H. Gibbs, Christopher Cooper and Jewel Counts[#]. "Democratic Party's Process Undemocratic." *Charlotte Observer*. May 23, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "Political Mudslinging has a Long History in our Democracy." *Asheville Citizen-Times*. May 4, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "Race, Gender Intrude on Democratic Race." *Asheville Citizen-Times*. March 30, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "Turnout Tsunami." *Asheville Citizen-Times*. February 17, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "The Field Narrows." *Asheville Citizen-Times*. January 13, 2008.

Cooper, Christopher A., and H. Gibbs Knotts. "Tar Heels Need to Become More Aware of State Politics." *Asheville Citizen-Times*. April 8, 2007.

Cooper, Christopher A., and Niall Michelsen. "College Education Must Play a Role in Teaching Civic Responsibility." *Asheville Citizen-Times*. October 13, 2006.

Cooper, Christopher A., and H. Gibbs Knotts. "People Across the Nation Divided on Confederate Flag." *The Greenville (SC) News*. August 10, 2006.

Brennan, Kathleen, and Christopher A. Cooper. "WNC Natives and in-migrants Have More Common Values Than They know." *Asheville Citizen-Times*. December 12, 2004.

Cooper, Christopher A. "Opinion Polls, While not Perfect, Give Voice to the Public." *Asheville Citizen-Times*. October 20, 2004.

Cooper, Christopher A. "Kerry's choice of Edwards Unlikely to Have Large Impact on Election Outcomes." *Asheville Citizen-Times*. July 21, 2004.

Cooper, Christopher A. "A Money Spinner for the West." *Raleigh News and Observer*. July 1, 2004.

Cooper, Christopher A. "How to Increase Voter Turnout." *Charlotte Observer*. June 24, 2004.
[Reprinted in the *Smoky Mountain News*.]

Cooper, Christopher A. "Trust in Government Declining, From City Hall to White House." *Asheville Citizen-Times*. June 13, 2004.

OTHER PUBLICATIONS [8]

Cooper, Christopher A., and H. Gibbs Knotts. 2020. "Tips for Talking with the Media." *The Department Chair*. 31(2): 10-11. (editor reviewed)

Cooper, Christopher A. 2020. "Back to Basics: Cultivating Community Among Faculty." *The Department Chair* 30(4): 3-4. (editor reviewed)

Cooper, Christopher A. 2020. Review of *The Rise and Fall of the Branchhead Boys: North Carolina's Scott Family and the Era of Progressive Politics*. *North Carolina Historical Review*.

Collins, Todd A., and Christopher A. Cooper. 2011. "The Case Salience Index: A Potential New Measure of Legal Salience." *Law and Courts Newsletter* 21: 5-7. (editor reviewed)

Cooper, Christopher A. 2010. Instructor's Manual for *State and Politics: Institutions and Reform*, *Second Edition*., by Todd Donovan, Christopher Mooney and Daniel Smith. Wadsworth Publishing.

Collins, Todd A., Christopher A. Cooper, and H. Gibbs Knotts. 2008. "Picturing Political Science." *PS: Political Science and Politics*, 42: 365. (editor reviewed)

Cooper, Christopher A. 2008. Instructor's Manual for *State and Politics: Institutions and Reform*, by Todd Donovan, Christopher Mooney and Daniel Smith. Wadsworth Publishing.

Cooper, Christopher A. 2006. Review of *Bringing Representation Home: State Legislators Among Their Constituencies*, by Michael A. Smith. *Perspectives on Politics* 2: 603-604.

CONFERENCE PRESENTATIONS

**Virtual*

"The Rise of the Unaffiliated Voter in North Carolina." Presented at the State of the Parties 2020 and Beyond Virtual Conference. Ray C. Bliss Institute for Applied Politics, University of Akron. November, 2021 (with J. Michael Bitzer, Whitney Ross Manzo, and Susan Roberts).*

"Redistricting in North Carolina." Panel Discussion at Redistricting and American Democracy Conference. Sanford School, Duke University. September, 2021.

"Is The Appalachian Voter Distinct?" Poster Presented at the Appalachian Studies Association. March, 2021.*

"Innumeracy and State Legislative Salaries." Presented at the North Carolina Political Science Association. February, 2021.*

"Roundtable: North Carolina and the 2020 Election." North Carolina Political Science Association. February 2021.*

"The Southern Voter." Presented at the Citadel Symposium on Southern Politics. March, 2020 (with Scott H. Huffmon, H. Gibbs Knotts, and Seth McKee).

"Cooper, Christopher A., Scott Huffmon, and, H. Gibbs Knotts. "The Politics of Southern Identity" Presented at the Biennial Meeting of the Southern Studies Forum. Odense, Denmark. April, 2019

"Heritage v. Hate: Assessing Opinions in Debate Over Confederate Monuments and Memorials." Presented at the Annual Meeting of the South Carolina Political Science Association. February, 2019 (with Scott H. Huffmon, H. Gibbs Knotts, and Seth McKee).

"Still Fighting the Civil War? Southern Opinions on the Confederate Legacy?" Presented at the Biennial Meeting of the Citadel Symposium on Southern Politics. March, 2018 (with M.V. Hood III, Scott H. Huffmon, Quentin Kidd, H. Gibbs Knotts, and Seth C. McKee).

"Leaving the (Political) Party in the South: Unaffiliated Voters and the Future of the Southern Electorate." Presented at the Auburn University Montgomery Southern Studies Conference. February, 2018.

"The Resilience of Southern Identity." Presented at the Biennial Meeting of the Southern American Studies Association. March, 2017 (with H. Gibbs Knotts).

"The Five Factor Model, Public Service Motivation, and Person-Organization Fit." Presented at the Northeastern Conference for Public Administration. Harrisburg, PA. November, 2016.

"Furling the Flag: Examining the Legislative Vote to Remove the Confederate Flag from the Statehouse Grounds in South Carolina." Presented at the Citadel Symposium on Southern Politics. March, 2016 (with Latasha Chaffin and H. Gibbs Knotts).

"Tuition vs. Fees: Breaking Down the Ballooning Costs of Attendance in America's Public Colleges." Presented at the Northeastern Conference for Public Administration. Arlington, VA. November, 2015 (with Tyler Reinagel).

"Charter Reform in City Government: The Case of Columbia, SC." Presented at the Annual Meeting of the Southeastern Conference for Public Administration. Charleston, SC. October, 2015 (with James Bourne and H. Gibbs Knotts).

"The Bluest Red State in America: North Carolina as a Swing State." Presented at the Annual Meeting of the Midwest Political Science Association. Chicago, IL. April, 2015 (with H. Gibbs Knotts)

"Personality Predictors of Job Satisfaction in Public Administrators." Presented at the Annual Meeting of the Southeastern Psychological Association. Hilton Head, SC. March, 2015 (with John Luke McCord).

Kaysing, Nicole, Erin Leonard, Adam Keath, Justin Menickelli and Christopher A. Cooper. "Perceived Sexual Orientation of Women in Sports and Non-Sport Contexts. 2015 SHAPE America National Convention and Expo. Seattle, WA March, 2015.

Menickelli, Justin, Maridy Trom, Tom Watterson, Christopher A. Cooper and Dan Grube. "Activity Monitor Accuracy in Assessing Caloric Expenditures in Obese Adults." 2015 SHAPE America National Convention and Expo. Seattle, WA March, 2015.

"The Resilience of Southern Identity." Presented at the AUM Southern Studies Conference 2015. February 2015 (with Gibbs Knotts).

"Personality and Nonprofit Management." Presented at the Northeastern Conference on Public Administration. October, 2014.

"What Do Wilbur Zelinsky and the Beatles Have in Common?" Presented at the Annual Meeting of the Association of American Geographers. Tampa, FL. April 2014 (with Gibbs Knotts)

"Blue Beacon in the South, or the New South Carolina? North Carolina Politics in the 21st Century" Presented at the Citadel Symposium on Southern Politics. Charleston, SC. February, 2014 (with Gibbs Knotts)

"A 'Court' of Public Opinion Influence on Judicial Decision-Making in the U.S. Supreme Court." Presented at the Public Choice Society Conference. March, 2014 (with Todd Collins).

"Appointed Senators: Treadmill to Oblivion or Stairway to Success?" Presented at the Southern Political Science Association. Orlando, FL. January, 2014 (with Gibbs Knotts)

"Unpacking Southern Identity." Presented at the Southern American Studies Association Meeting. Charleston, SC. February, 2013 (with Gibbs Knotts)

"Southern Identity Revisited." Presented at the Southern Political Science Association. Orlando, FL. January, 2013 (with Gibbs Knotts)

"Reassessing Case Salience." To be presented at the American Political Science Association. New Orleans, LA. August, 2012 (with Todd Collins). [Conference was cancelled due to Hurricane]

"The Southern Focus Poll Revisited." Presented at the Citadel Symposium on Southern Politics. Charleston, SC. February, 2012 (with Gibbs Knotts).

Menickelli, J., Smith, J., Claxton, D, Troy, M., Cooper, C., & Grube, D. (2012, March). Validity of the Walk4Life MVP Pedometer for Measuring Steps and Moderate-to-Vigorous Physical Activity. Presented at the AAHPERD Convention, Boston.

Menickelli, J., Tuten, C., Cooper, C., Grube, D., Claxton, D., Barney, D. & Lyksett, J. (2012, March). Disc Golf and Walking Benefits: A Pedometer-Based Exercise Assessment. Presented at the AAHPERD Convention, Boston.

"In Search of Meaning in Southern And Dixie Business Names." Presented at the Annual Meeting of the North Carolina Political Science Association. Charlotte, NC. February, 2011 (with Gibbs Knotts and Hope Alwine#).

"Media Coverage of the Burger Court." Presented at Southern Political Science Association. New Orleans, LA. January, 2011 (with Todd A. Collins).

"Measuring Legal Salience." Presented at the Annual Meeting of the Midwest Political Science Association. Chicago, IL. April, 2010 (with Todd A. Collins).

"Love 'Em or Hate 'Em: Opinions of Southerners between 1964 and 2008." Presented at the Citadel Symposium on Southern Politics, March, 2010 (with Gibbs Knotts).

"The Geography of Social Identity in Appalachia." Presented at the Annual Meeting of the North Carolina Political Science Association. Durham, NC. February, 2010 (with Gibbs Knotts and Katy Elders).

"Methodological Tools in SoTL" Presented at the International Society for the Scholarship of Teaching and Learning. Bloomington, IN. October, 2009 (with John Habel, Mary Jean Herzog, and Kathleen Brennan).

"Guided by Voices: Understanding Student Learning." Presented at the International Society for the Scholarship of Teaching and Learning. Edmonton, AL. October, 2008 (with Anna McPhadden, Chesney Reich, Glenn Bowen, Laura Cruz, and Carol Burton).

"Two Approaches to Place and Civic Engagement." Presented at the American Democracy Project. Snowbird, UT. June, 2008 (with Sean O'Connell).

"Overlapping Identifies: Investigating the Causes and Consequences of Social Identify in the South." Presented at the Citadel Symposium on Southern Politics, March, 2008 (with Gibbs Knotts, presenter).

"The Importance of Voter Files for State Politics Research." Presented at the Annual Meeting of the Southern Political Science Association. New Orleans, LA. January, 2008 (with Gibbs Knotts and Moshe Haspel).

"Beyond Racial Threat." Presented at the Annual Meeting of the American Political Science Association. Chicago, IL. September, 2007 (with Gibbs Knotts and Moshe Haspel).

"News Media and the State Policy Process: Perspectives from Legislators and Political Professionals." Presented at the 7th Annual Conference on State Politics and Policy. Austin, TX. February, 2007 (with Martin Johnson).

"Politics and the Press Corps: Reporters, State Legislative Institutions and Context." Presented at the Annual Meeting of the American Political Science Association. Philadelphia, PA. August, 2006 (with Martin Johnson).

"Politics and the Press Corps: Reporters, State Legislative Institutions and Context." Presented at the 6th Annual Conference on State Politics and Policy. Lubbock, TX. May, 2006 (with Lilliard Richardson).

"The Impact of Multi-Member Districts on Descriptive Representation in U.S. State Legislatures, 1975-2002." Presented at the 6th Annual Conference on State Politics and Policy. Lubbock, TX. May, 2006 (with Lilliard Richardson).

"Trust in Government, Citizen Competence and Public Opinion on Zoning." Paper presented at the Annual Meeting of the North Carolina Political Science Association. High Point, NC. March, 2006 (with Gibbs Knotts and Kathleen Brennan).

"Casework in U.S. State Legislatures." Presented at the Annual Meeting of the Southern Political Science Association. Atlanta, GA. January, 2006 (with Lilliard Richardson).

"Voice of the People: Letters to the Editor in America's Newspapers." Presented at the Annual Meeting of the American Political Science Association. Washington, DC. August, 2005 (with H. Gibbs Knotts).

"Newsgathering in America's Statehouses." Presented at the 5th Annual Conference on State Politics and Policy. East Lansing, MI. May, 2005 (with Martin Johnson).

"Media Coverage of Scandal and Declining Trust in Government: An Experimental Analysis of 9/11 Commission Testimony." Presented at the Annual Meeting of the Midwest Political Science Association. Chicago, IL. April, 2005 (with Anthony Nownes).

"Beyond Dixie: Race, Region, and Support for the South Carolina Confederate Flag." Presented at the Annual Meeting of the North Carolina Political Science Association. Pembroke, NC. March, 2005 (with H. Gibbs Knotts).

"Media Bias and American Statehouse Reporting." Presented at the Annual Meeting of the Southern Political Science Association. New Orleans, LA. January, 2005 (with Martin Johnson).

"The Impact of Institutional Design on State Legislative Representation." Presented at the 4th Annual Conference on State Politics and Policy. Kent, OH. April, 2004 (with Lilliard Richardson).

"Defining Dixie: Searching for a Better Measure of the Modern Political South." Presented at the 2004 Citadel Symposium on Southern Politics. March, 2004 (with H. Gibbs Knotts).
[Also presented at the Annual Meeting of the North Carolina Political Science Association. Elon University. March, 2004.]

"Negotiating Newsworthiness: Organized Interests and Journalists in the States." Presented at the Annual Meeting of the Southern Political Science Association. New Orleans, LA. January, 2004 (with Anthony J. Nownes).

"State Legislators in the Internet Age." Presented at the Annual Meeting of the American Political Science Association. Philadelphia, PA. August, 2003. (with Lilliard Richardson).

"Descriptive Representation in Multi-Member Districts, 1975-2002." Presented at the Annual Meeting of the Midwest Political Science Association. Chicago, IL. April, 2003 (with Lilliard Richardson).

"The Consequences of Multi-Member Districts in the State Legislature." Presented at the 3rd Annual Meeting of the Conference on State Politics and Policy. Tucson, AZ. March, 2003 (with Lilliard Richardson).

"I Learned it From Jay Leno: Entertainment Media in the 2000 Election." Presented at the Annual Meeting of the South Carolina Political Science Association. Rock Hill, SC. February 2003 (with Mandi Bates). Also presented at the Annual Meeting of the North Carolina Political Science Association. Elon, NC.

"Do Advertorials Work?" Presented at the Annual Meeting of the Southern Political Science Association. Savannah, GA. November 2002 (with Anthony Nownes).

"Legislative Representation in the Face of Direct Democracy." Presented at the 2nd Annual Conference on State Politics and Policy. Milwaukee, WI. May, 2002 (with Lilliard E. Richardson).

"Local Citizen Groups." Presented at the Annual Meeting of the Western Political Science Association. Long Beach, CA. March 2002 (with Anthony J. Nownes).

"Internet Use in the State Legislature." Presented at the Annual Meeting of the Western Political Science Association. Las Vegas, NV. March, 2001.

"Media Consumption in the State Legislature." Presented at the Annual Meeting of the Western Political Science Association. Las Vegas, NV. March 2001.

"Media and the State Legislature." Presented at the Annual Meeting of the American Political Science Association. Washington, DC. September, 2000.

"Depictions of Public Service in Children's Literature." Presented at the Annual Meeting of the International Society for Political Psychology. Seattle, WA (with Marc Schwerdt). July, 2000.

"Former State Legislators in the U.S. Congress During the 1990's." Presented at the Annual Meeting of the Southern Political Science Association. Atlanta, GA. (with Lilliard E. Richardson). August, 1999.

INVITED TALKS AND COMMUNITY SPEAKING ENGAGEMENTS

**Virtual*

"State and Local Government in NC," Leadership Asheville. December, 2021.

"The Resilience of Southern Identity." West Forum, Winthrop University. November, 2021 (with Gibbs Knotts).

"Running Elections in NC—an Insider's Perspective." Panel for Carolina Public Press. November, 2021.*

"North Carolina Politics Primer." Presented to Leadership Asheville Seniors. November, 2021.*

Co-host and Co-Moderator for Sylva Town Commission Debate. October, 2021*

"Redistricting." Presented to Politica. October, 2021*

"The Swain County Electorate." Presented to Indivisible, Swain County.*

"The Jackson County Electorate." Presented to the Jackson County NC Democratic Women.

"Introduction to North Carolina Government." Presented at the Science Policy Bootcamp and NC STEM Policy Fellowship Orientation. Sigma Chi.* June, 2021.

"The Landscape of North Carolina Politics." Presented to the NC League of Municipalities Conference, April, 2021.*

"Politics 2021" Presented to the Hendersonville Rotary. February, 2021.*

"Election Recap." Presented to NC Association of City and County Managers." February, 2021.*

"State and Local Government in North Carolina." Presented to Leadership Asheville, January 2021.*

"Election 2020: In the Rear View Mirror." Presented to Leadership Asheville Foundation. November, 2020.*

"Election 2020: In the Rear View Mirror." Presented to Sylva Rotary. November, 2020.*

"Election 2020." Presented to Leadership Asheville Seniors. October, 2020.*

"North Carolina Politics." Presented to University of Chicago Harris School Alumni Association. October 2020. *

"Election Data." Guest Lecture for Gerry Cohen's Election Law Class at the Duke University Sanford School of Public Policy. October, 2020. *

"Election 2020." City of Burlington, NC. October 2020. *

"Election 2020" Haywood Sunrise Rotary Club. October, 2020. *

Election 2020 from the Bottom Up." Asheville Chamber of Commerce Executive Committee. September 2020. *

"Election 2020." Policy on Tap. Asheville Chamber of Commerce. September 2020.

"North Carolina Elections 2020." Folkmoot. Waynesville, NC. September, 2020. *

"Measuring, Mapping and Interpreting Southern Identity." Guest Lecture for Derek Alderman's Geography of the South class. University of Tennessee, Knoxville. *

"Thoughts on Election 2020." Leadership Asheville Buzz Breakfast. August, 2020). *

"Local, Regional, and State Political Climate." Asheville Rotary Club. July, *

"Political Polarization: Causes and Consequences." Givens Estate. May, 2020; *

"Gerrymandering." Hinton Rural Life Center. February, 2020.

"Elections 2020." Hendersonville Rotary Club.

Moderator, 11th Congressional District Democratic Forum. Jackson County Library. February, 2020.

"State and Local Elections 2020." Presented at the Leadership Asheville Foundation. January, 2020.

"North Carolina Redistricting." Presented at the Asheville Chamber of Commerce. December, 2019.

"State and Local Government." Presented at Leadership Asheville. December, 2019.

"Politics 2020." Roundable on NC Spin (UNC-TV)

"A User's Guide to the 2020 Election." Presented at Life@WCU (two presentations). November, 2019.

"The Resilience of Southern Identity." Presented at Clemson University's Osher Lifelong Learning Institute. (with Gibbs Knotts). November 8, 2019.

"The Resilience of Southern Identity." Presented at the West Forum, Winthrop University. November, 2018.

"2018 Elections." Presented to the Foundation Board of Blue Ridge Public Radio. November, 2018.

"2018 Elections." Roundtable on NC Spin (UNC-TV).

"The Future of the Two-Party System." Presented at Leadership Asheville Foundation. October, 2018

"The 2018 Election" Presented at the Beth HaTePhelia Congregation Brotherhood Luncheon. October, 2018

"The 2018 Constitutional Amendments." Presented at the Cathedral of All Souls. Asheville, NC. October, 2018.

"Elections and North Carolina Politics in 2018." Presented at the NC Local Government Budget Officers Association Annual Summer Meeting. Atlantic Beach, NC. July 2018.

"State and Local Government in North Carolina." Leadership Asheville. December, 2018.

"Politics 2017." Presented at Life@WCU (two presentations). November, 2018.

Moderated 11th Congressional District Democratic Primary Debate. Canton, NC. April, 2018.

"The Resilience of Southern Identity." Madstone Café and Books. September, 2017.

Moderated Asheville City Council Debate. Givens Estate. August, 2017.

"Politics in Western North Carolina." Presented at the Hinton Rural Life Center. June, 2017.

"Redistricting." Presented at the FairVote Forum, Haywood Community College. June, 2017.

"Redistricting." Presented to the Asheville Chamber of Commerce. May, 2017.

"Man is, by Nature, a Political Animal." Presented at the Science Café. Sylva, NC. March, 2017.

"State of State Politics." Presented to Leadership Asheville Foundation Luncheon. March, 2017.

"Raising Your Voice: Contacting Your Representatives in a Polarized Age." Presented at the Haywood County Library. March, 2017.

"Politics 2017." Presented to the NC City/County Manager's Association in Durham, NC. February 2017.

"Election 2016." Presented at the WCU Alumni Association Meeting in Charlotte, NC. October, 2016.

Speaker and Moderator for Buncombe County Commissioner Debate. October, 2016.

"Election 2016." Presented at the WCU Alumni Association Meeting in Atlanta, NC. October, 2016.

"Election 2016." Presented at the South Asheville Rotary Club. October, 2016.

"Election 2016." Presented at the Buncombe County Rotary Club. October, 2016.

"Election 2016." Presented at the Sylva Rotary Club. October, 2016.

"Election 2016." Presented at Beth Hatephelia Brotherhood Lunch. October, 2016.

"Politics 2016." Presented at Life@WCU. Cullowhee and Asheville. October 2016.

"Political Polarization." Presented to the Buncombe County League of Women Voters. June 2016.

"Congress Today." Presented at Life@WCU. Cullowhee, and Asheville. November, 2015.

"Politics 2015." Presented at the Highlands Leadership Series. Highlands, NC. July, 2015.

"Politics in North Carolina." Presentation to the Nonprofit Pathways Policy Conference. January, 2015.

"Polarization in Politics." Presented at the Givens Estate, Asheville, NC. June 2015.

"Politics Today in North Carolina." Presented at Leadership Asheville. Asheville, NC. February, 2015.

"North Carolina For Nonprofits." Presented at the Nonprofit Pathways Public Policy Briefing. January 2015.

"Regional Outlook Report." Presented at Lead WNC, Cullowhee, NC. November, 2014.

"North Carolina Politics." Presented at Leadership Asheville, Asheville, NC. November, 2014.

"Election 2014." Presented at Beth Hatephelia Synagogue. Asheville, NC. October 2014.

"Electoral Politics in the United States." Presented to the Finance Directors for America's Motor Speedways. October, 2013.

"The Current State of American Civics." 2nd Annual Social Work Conference: Citizenship and Civility: Working Together for Practical Advocacy in a Polarized Era. May, 2013.

"Election 2012." Presented at Sylva Rotary Club. Sylva, NC, October, 2012.

"Election 2012." Presented at Leadership Asheville. Asheville, NC, October, 2012.

"Election 2012." Keynote address to the Motor Speedway Finance Officers. September, 2012.

"Election 2012 in North Carolina." Keynote address to the North Carolina Association of Electrical Cooperatives. September, 2012.

"Election 2012." Keynote address to the North Carolina City/County Manager's Association Summer Meeting. June, 2012.

"What Do The Data Tell Us About Hunger?" Presented at Leadership Asheville. Asheville NC, April, 2012.

"Public Opinion on Second Home Development." Presented at the Symposium on Second Home Development. Asheville, NC April, 2011.

"North Carolina Politics" (with Gibbs Knotts). Presented to the Association of North Carolina Budget Officers. Grove Park Inn, Asheville, NC. 2010.

"Engaged Scholarship and the Public Policy Institute." Presented to the Morehead State Leadership Institute, 2009.

"Progressivism in North Carolina Politics" (with Gibbs Knotts). Presented at the John Locke Foundation. Raleigh, NC, June, 2008.

"Political Change in Western North Carolina." Presented at the Economic Forecast Forum, sponsored by the NC Association of Bankers and the NC Chamber of Commerce. Raleigh, NC, January, 2008.

"Multi-Member Districts." Electoral Reform: 2006 and Beyond Conference. Columbus, OH, January, 2007.

"Rhetoric on Representation." University of California, Riverside, November, 2006.

"The Importance of Undergraduate Research." Presentation to the Winthrop University Undergraduate Research Expo. February, 2006.

"Perspectives on Economic Development Research." Presentation to Business Librarians in North Carolina. August, 2005.

"The Importance of a Political Science Education." Presentation to Winthrop University Pi Sigma Alpha Chapter Keynote speaker, Pi Sigma Alpha initiation, Winthrop University, February 2003.

CONTRACTS AND GRANTS

"Policymaking in the Shadows: Collaborative Governance, University Governing Boards and the New Politics of Higher Education." Graduate School and Research. $5000.

"Opt-In Survey." 2013. $8,896.

"Public Opinion on the Town Square Property in Black Mountain, NC." 2010. $6,000.

"French Broad River Congestion Management Plan." 2010. Subcontract from The Louis Berger Group. $5000.

"Evaluating Health Risk in Yancey County Schools." 2010. $500.

"Know Your Region." A Contract with the US Economic Development Administration. 2009. Co-PI with John Hensley. $50,000.

"American Youth Congress." 2009. NC Civic Education Consortium/Z Smith Reynolds. $6000.

"Voter Education Initiative." 2008. NC Campus Compact. $500.

"Citizen Satisfaction in Buncombe County." 2007. $16,577.

"Evaluating Health Risk in Yancey County Schools." 2007. $500.

"Regional Outlook Report." 2007. Internal Contract with the Institute for the Economy and the Future. $6,500.

WCU Summer Research Fellowship. 2007. $1500.

Co-Principal Investigator (with H. Gibbs Knotts). Sponsored contract with the city of Asheville, NC to consult about the design of a citizen satisfaction survey. $3,000.

WCU Summer Research Grant, 2001. $5000.

Yates Dissertation Fellowship, UTK, 2001. $5000.

Undergraduate Education Improvement Grant, UTK Department of Political Science, 2001. $1000.

Dissertation Fellowship, UTK Department of Political Science, 2001. $700.

TEACHING

COURSES TAUGHT

Election Administration (Graduate)
State and Local Governance (Graduate)
Political Analysis (Undergraduate)
State and Local Government (Undergraduate, Traditional and Distance Education)
Political Parties, Campaigns and Elections (Undergraduate)
Research Methods for Public Affairs (Graduate)
Southern Politics (Undergraduate)
Public Policy Analysis (Graduate)
Public Affairs Capstone Experience (Graduate)
Public Affairs Administration (Graduate)
Simulation in American Politics (Undergraduate)
Election 2012 (Undergraduate)
Interdisciplinary Approaches to the Study of Politics (Undergraduate, Freshman Seminar)
Introduction to American Government (Undergraduate)
Mass Media and American Politics (Undergraduate)
Civic Engagement (Undergraduate)
The University Experience (Undergraduate)
Advanced Writing in Political Science (Undergraduate)
Public Administration (Undergraduate)
Internship in Political Science (Undergraduate)
Co-op in Political Science (Undergraduate)
MPA Internship Experience (Graduate)
Metropolitan Government (Graduate)
Capstone in Public Affairs (Graduate)
A variety of independent studies on state politics and elections

THESIS & DISSERTATION COMMITTEES

Christopher Franklin (EdD, 2016)
John Luke McCord (MA, Psychology, 2016, Chair)
Amy Jones (EdD, 2014)
Whitney Bridges-Campbell (MA, Psychology, 2013)
Kimberlee Cooper (MA, Psychology, 2013)
David Solomon (MA, Psychology 2012)
Christopher Holden (MA, Psychology, 2012)
Jenny Smith (MA, HHP, 2011)
Benjamin Locklair (MA, Psychology, 2011)

Brandon Rice (MA, English, 2010)
Andrew Johnson (MA, Psychology , 2010)
Heidi Turlington (MA HHP, 2009)
Joe Hurley (MA, History 2006)

SERVICE

SERVICE TO THE PROFESSION

External Reviewer for Tenure and/or Promotion Cases at:
Furman University
University of Minnesota, Duluth

External Program Reviewer for:
Missouri State University Political Science, MPA, and International Studies
Tennessee Tech University Political Science
University of West Florida Political Science
Western Carolina University Higher Education Student Affairs MA Program
Western Carolina University International Programs and Services
Western Carolina University Mountain Heritage Center

Editorial Boards, Disciplinary Committees, and Section Chair Duties at Conferences

Editorial Board, Journal of Election Administration Research and Practice (2021-)
Editorial Board, Social Science Journal (2021-)
Executive Committee Member, North Carolina Political Science Association (2021-)
Chair, State Politics and Policy Quarterly Best Paper Award Committee (2021-2022)
Chair, Student Paper Committee, North Carolina Political Science Association (2021-)
Consultant, Greensboro History Museum Project Democracy 20/20 Exhibit (2021)
Section Chair for State and Local Politics Section of the Southern Political Science Association (2008)

Reviewer for [since 2010]:
American Journal of Political Science
American Political Science Review
American Politics Research
American Review of Politics
American Review of Public Administration
American Sociological Review
Association of American Geographers
Congress and the Presidency
European Journal of Personality
Geography Compass
Group Processes and Intergroup Relations
International Journal of Health Policy and Management
International Journal for the Scholarship of Teaching and Learning
International Public Management Journal
International Review of Public Administration
Journal of Appalachian Studies
Journal of Food Science Education
Journal of Hate Studies
Journal of Information Technology and Politics

Journal of Political Science
Journal of Political Science Education
Journal of Politics
Journal of Public and Nonprofit Affairs
Journal of Public Administration Research and Theory
Journal of Public Affairs Education
Justice System Journal
Landscape Research
Legislative Studies Quarterly
Personality and Individual Differences
PLOS ONE
Political Behavior
Political Communication
Political Research Quarterly
Politics and Policy
PS: Political Science and Politics
Public Administration Review
Public Opinion Quarterly
Public Budgeting and Finance
Public Management Review
Public Personnel Management
Public Performance and Management Review
Review of Public Personnel Administration
Social Science Journal
Social Science Quarterly
Social Forces
Southeastern Geographer
State and Local Government Review
State Politics and Policy Quarterly
Social Problems
Social Science and Medicine
Social Science Journal
Southeastern Geographer
Southern Cultures
Urban Affairs Review
Oxford University Press
University of South Carolina Press
Routledge
Rowman and Littlefield
Palgrave McMillan
CQ Press
Carnegie Foundation for the Advancement of Teaching
National Science Foundation

Discussant and Panel Chair Duties at Conferences

Discussant for panel on "Congressional Politics." Citadel Symposium on Southern Politics. March, 2020.

Discussant for panel on "Electoral Reform in North Carolina." North Carolina Political Science Association. February, 2011.

Chair for panel on "Economic Development Policies." North Carolina Political Science Association. Durham, NC. February, 2010.

Chair for panel on "The Future of State Politics." Southern Political Science Association. New Orleans, LA. January, 2008.

Discussant for panel on "Electoral Reform." American Political Science Association. Chicago, IL. September, 2007.

Discussant for panel on "Disaster: Politics and Policy." Policy History Conference. Charlottesville, VA. June, 2006.

Chair and Discussant for panel on "Issues in Electoral Politics." North Carolina Political Science Association. High Point, NC. March, 2006.

Discussant for panel on "Issues in American Politics." North Carolina Political Science Association. High Point, NC. March, 2006.

Discussant for panel on "North Carolina Politics." Citadel Symposium on Southern Politics. Charleston, SC. February, 2006.

Chair and discussant for panel on "State Policy. American Political Science Association. Washington, DC. September, 2005.

Discussant for panel on state politics. Annual Meeting of the Midwest Political Science Association. Chicago, IL. April, 2005.

Chair and Discussant for panel on "Electoral Politics." Annual Meeting of the North Carolina Political Science Association. Cullowhee, NC. March, 2004.

Discussant, "State Legislative Elections." Annual Meeting of the Southern Political Science Association. New Orleans, LA. January, 2004.

Discussant and Chair, "Highlighting Student Research." Annual Meeting of the South Carolina Political Science Association. Rock Hill, SC. February 2003.

Discussant and Chair, "Media Coverage of Elections and Representation." Annual Meeting of the Southern Political Science Association. November, 2002.

UNIVERSITY, COLLEGE & DEPARTMENT SERVICE

Current and Continuing

- Dept. of Political Science, Tenure, Promotion and Reappointment Committee (2008-present)
- MPA Committee (2002-present)
- Coulter Faculty Commons Advisory Board (2016-)
- University Collegial Review Committee (2020-)
- Congressional Internship Selection Committee (2018-)
- Committee on National and International Scholarships and Awards (2020-)
- Chair, Search Committee to hire Government Affairs Liaison/Deputy Chief of Staff

Previous Service

- Pathfinders Task Force to Select New Learning Management System (2020)
- Provost Search Committee (2020)
- Bookstore Director Search Committee (2020)
- Student Assessment of Instruction Task Force (2018-2019)
- Task Force to Select New Assessment Software (2018-2019)
- Regional Conference Planning Committee (2012-2016)
- Editor, Faculty Forum (2016-2019)
- COACHE survey task force (2015-2016)
- Facilitator, Leadership Summit (2015)
- Faculty Senate (2009-2015)
- SAI Standardization Task Force (2015)
- Academic Policy Review Council (2013-2015)
- Arts and Sciences Tenure, Promotion and Reappointment Committee (2008-2014)
- Chair, Search Committee for Public Administration Faculty (2015)
- Book Store Task Force (2014)
- Search Committee for Public Administration Faculty (2014)
- Search Committee to hire an Assistant Professor in Public Administration (2012-2013)
- Chair, search committee to hire a visiting assistant professor in International Relations
- Chair, search committee to hire a lecturer in American Politics and Global Issues
- Search Committee for Research Development Specialist (2014)
- Search Committee for Human Geography (2014)
- Chair, Search Committee to hire Comparative Politics Faculty (2013)
- Chair, Faculty Affairs Caucus (2010-2011; 2012-2013)
- Dean of Arts and Sciences Search Committee (2012-2013
- Faculty Affairs Caucus (2009-2014)
- Faculty Senate Planning Team (2010-2011; 2012-2013)
- Chair, 2020 Commission Subcommittee on Community Partnerships (2012)
- Chair, Search Committee to hire an Administrative Support Associate in the Department of Political Science and Public Affairs (2012)
- Chair, Search Committee to hire a Research Support Associate in the Coulter Faculty Center (2011)
- Search Committee to hire an Assistant Professor in Parks and Recreation Management (2012)
- Search Committee to hire an Assistant Professor in Public Administration (2012)
- Search Committee to hire a Visiting Assistant Professor in Public Administration (2012)
- College of Business Research Award Committee (2012)
- Institutional Review Board (2005-2011)
- Mountain Heritage Center Program Assessment Team (201!)
- Chair, American Democracy Project (2010-2011)
- Arts and Sciences Program Prioritization Task Force (2011)
- Cullowhee Revitalization Task Force (2010)
- Chair, Department Graduate Recruitment Committee
- Chair, Department Graduate Comps Committee
- Chair, Department Graduate Internship Committee
- International Relations Search Committee (2010)

- WCU/Dillsboro Partnership Task Force (2009-2010)
- QEP Assessment Committee (2007-2010)
- Arts and Sciences Teaching Award Committee (2009-2010)
- Co-Chair Social Science Research Forum (2007-2010)
- Chair, MPA Director Search Committee (2009-2010)
- Public Administration Search Committee (2009-2010)
- Chair, MPA Director Search Committee (2008-2009)
- Public Administration Search Committee (2008-2009)
- International Relations Search Committee (2008-2009)
- Chair, Graduate Research Grant subcommittee of the Research Council (2008)
- College Restructuring Task Force (2008-2009)
- Athletics Committee (2006-2009)
- Graduate Council (2006-2009)
- Research Council (2005-2008)
- Chair, Graduate Research Grant subcommittee of the Research Council (2008)
- Co-chair, Integration of Learning Award subcommittee of the Student Learning Committee (2008)
- Outreach and Engagement Committee for UNC-Tomorrow (2008)
- Humphrey Fellows Steering Committee (2007-2008)
- Chair, Public Administration Search Committee (2007-2008)
- Chair, Institutional Review Board (2005-2007)
- Chair, Public Administration Visiting Search Committee (2007)
- Public Law visiting assistant professor search committee (2006)
- International Relations visiting instructor search committee (2006)
- Congress to Campus Coordinator (2006)
- President, University Club (2006-2007)
- Arts and Sciences Strategic Planning Committee (2005-2007)
- Arts and Sciences Dean's Advisory Board (2006-2007)
- Committee Chair, National Youth Congress (April, 2005)
- Scholarship of Teaching and Learning Committee (2005-2006)
- Committee on Student Learning (2005-2008)
- ICPSR Representative for WCU (2004-2007)
- Created and Directed WCU faculty Quantitative Research Forum (2004-2005)
- Congress to Campus Coordinator (2004)
- Center for Regional Development Director Search Committee (2003)
- Public Administration Search Committee (2003)
- Co-op and Internship Coordinator, Dept. of Political Science, WCU (2002-2006)
- Webmaster, WCU Department of Political Science (2002-2007)

MEDIA APPEARANCES, ON-CAMPUS AND COMMUNITY SPEAKING

**Virtual*

- Quoted thousands of times in such media outlets including BBC (TV and Radio), CNN, Fox News, *New York Times*, *National Public Radio (All Things Considered, Weekend All Things Considered, Morning Edition), Christian Science Monitor*, Vox, *Washington Post, Wall Street Journal, Financial Times, ESPN.com, USA Today, Detroit Free Press, Raleigh News and Observer, Boston Herald*, *Business Insider, Asheville-Citizen*

Times, Charlotte Observer, Winston Salem Journal, National Journal, Rock Hill Herald, Smoky Mountain News, Hendersonville Times, Sylva Herald, Mountain Express, Yahoo Singapore News, Carolina Journal, Blue Ridge Public Radio, WUNC, WFAE, Roll Call, Waynesville Mountaineer, Voice of America, Zoomer Radio (Toronto, Canada), WLOS TV (Asheville, NC), WATV, WRAL (Raleigh, NC), WCNC (Charlotte, NC), WFSC, WJLA (Washington DC) and KISS FM, Spectrum News and many more.

Exhibit 8

NCLCV v. Hall
21 CVS 15426
LDTX176

Exhibit #
Cooper 4
JH-12/30/2021
exhibitsticker.com

Joint Meeting of Committees

August 12, 2021

House Committee on Redistricting

Senate Committee on Redistricting and Elections

Criteria Adopted by the Committees

- **Equal Population.** The Committees will use the 2020 federal decennial census data as the sole basis of population for the establishment of districts in the 2021 Congressional, House, and Senate plans. The number of persons in each legislative district shall be within plus or minus 5% of the ideal district population, as determined under the most recent federal decennial census. The number of persons in each congressional district shall be as nearly as equal as practicable, as determined under the most recent federal decennial census.

- **Contiguity.** No point contiguity shall be permitted in any 2021 Congressional, House, and Senate plan. Congressional, House, and Senate districts shall be compromised of contiguous territory. Contiguity by water is sufficient.

- **Counties, Groupings, and Traversals.** The Committees shall draw legislative districts within county groupings as required by *Stephenson v. Bartlett*, 355 N.C. 354, 562 S.E.2d 377 (2002) (*Stephenson I*), *Stephenson v. Bartlett*, 357 N.C. 301, 582 S.E.2d 247 (2003) (*Stephenson II*), *Dickson v. Rucho*, 367 N.C. 542, 766 S.E.2d 238 (2014) (*Dickson I*) and *Dickson v. Rucho*, 368 N.C. 481, 781 S.E. 2d 460 (2015) (*Dickson II*). Within county groupings, county lines shall not be traversed except as authorized by *Stephenson I*, *Stephenson II*, *Dickson I*, and *Dickson II*.

  Division of counties in the 2021 Congressional plan shall only be made for reasons of equalizing population and consideration of double bunking. If a county is of sufficient population size to contain an entire congressional district within the county's boundaries, the Committees shall construct a district entirely within that county.

- **Racial Data.** Data identifying the race of individuals or voters *shall not* be used in the construction or consideration of districts in the 2021 Congressional, House, and Senate plans. The Committees will draw districts that comply with the Voting Rights Act.

- **VTDs.** Voting districts ("VTDs") should be split only when necessary.

- **Compactness.** The Committees shall make reasonable efforts to draw legislative districts in the 2021 Congressional, House and Senate plans that are compact. In doing so, the Committee may use as a guide the minimum Reock ("dispersion") and Polsby-Popper ("permiter") scores identified by Richard H. Pildes and Richard G. Neimi in *Expressive Harms, "Bizarre Districts," and Voting Rights: Evaluating Election-District Appearances After Shaw v. Reno*, 92 Mich. L. Rev. 483 (1993).

- **Municipal Boundaries.** The Committees may consider municipal boundaries when drawing districts in the 2021 Congressional, House, and Senate plans.

Joint Meeting of Committees

August 12, 2021

House Committee on Redistricting

Senate Committee on Redistricting and Elections

- **Election Data.** Partisan considerations and election results data *shall not* be used in the drawing of districts in the 2021 Congressional, House, and Senate plans.

- **Member Residence.** Member residence may be considered in the formation of legislative and congressional districts.

- **Community Consideration.** So long as a plan complies with the foregoing criteria, local knowledge of the character of communities and connections between communities may be considered in the formation of legislative and congressional districts.

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
21 CVS 015426

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, et al.,

REBECCA HARPER, et al.,

Plaintiffs,

vs.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

Consolidated with
21 CVS 500085

AFFIDAVIT OF SEAN P. TRENDE

Now comes affiant Sean P. Trende, having been first duly cautioned and sworn, deposes and states as follows:

1. I am over the age of 18 and am competent to testify regarding the matters discussed below.

2. For the purposes of this litigation, I have been asked by counsel for Legislative Defendants to analyze relevant data and provide my expert opinions.

3. To that end, I have personally prepared the rebuttal report attached to this affidavit as Exhibit A, and swear to its authenticity and to the faithfulness of the opinions.

FURTHER THE AFFIANT SAYETH NAUGHT.

NCLCV v. Hall
21 CVS 15426
LDTX179

Exhibit #
Cooper 7
JH-12/30/2021
exhibitsticker.com

Executed on 28 December, 2021.

Sean P. Trende

Sean P. Trende

STATE OF FLORIDA

COUNTY OF PINELLAS

Sworn to and subscribed before me by online notarization this 28th day of December, 2021, by SEAN P. TRENDE, who appeared by way of two-way audio/video communication technology, and he provided his Ohio driver's license as identification.

Cynthia D. Glaros
Notary Public, State of Florida
My Commission Expires: 06/30/2022

Cynthia D. Glaros
Notary Public, State of Florida
Commission # GG228737
My Commission Expires June 30, 2022

Online Notary Public. This notarial act involved the use of online audio/video communication technology.

4891-5716-4549 v.1

Exhibit A

EXPERT REBUTTAL REPORT OF SEAN TRENDE

Now comes affiant Sean P. Trende, having been first duly cautioned and sworn, deposes and states as follows:

1. I am over the age of 18 and am competent to testify regarding the matters discussed below.

2. I currently reside at 1146 Elderberry Loop, Delaware, OH 43015. My e-mail is trende.3@buckeyemail.osu.edu.

3. I have been retained in this matter by the Legislative Defendants, and am being compensated at $400.00 per hour for my work in this case.

4. My *curriculum vitae* is attached to this report as Exhibit 1.

EXPERT CREDENTIALS

5. I am currently enrolled as a doctoral candidate in political science at The Ohio State University. I have completed all of my coursework and have passed comprehensive examinations in both methods and American Politics. My coursework for my Ph.D. and M.A.S. included, among other things, classes on G.I.S. systems, spatial statistics, issues in contemporary redistricting, machine learning, non-parametric hypothesis tests and probability theory. I expect to receive my Ph.D. in May of 2021. My dissertation focuses on applications of spatial statistics to political questions.

6. I joined RealClearPolitics in January of 2009 after practicing law for eight years. I assumed a fulltime position with RealClearPolitics in March of 2010. My title is Senior Elections Analyst. RealClearPolitics is a company of around 40 employees, with offices in Washington D.C. It produces one of the most heavily trafficked political websites in the world, which serves as a one-stop shop for political analysis from all sides of the political spectrum

and is recognized as a pioneer in the field of poll aggregation. It produces original content, including both data analysis and traditional reporting. It is routinely cited by the most influential voices in politics, including David Brooks of *The New York Times*, Brit Hume of *Fox News*, Michael Barone of *The Almanac of American Politics*, Paul Gigot of *The Wall Street Journal*, and Peter Beinart of *The Atlantic*.

7. My main responsibilities with RealClearPolitics consist of tracking, analyzing, and writing about elections. I collaborate in rating the competitiveness of Presidential, Senate, House, and gubernatorial races. As a part of carrying out these responsibilities, I have studied and written extensively about demographic trends in the country, exit poll data at the state and federal level, public opinion polling, and voter turnout and voting behavior.

8. In particular, understanding the way that districts are drawn and how geography and demographics interact is crucial to predicting United States House of Representatives races, so much of my time is dedicated to that task.

9. I am currently a Visiting Scholar at the American Enterprise Institute, where my publications focus on the demographic and coalitional aspects of American Politics. My first paper focused on the efficiency gap, a metric for measuring the fairness of redistricting plans.

10. I am the author of *The Lost Majority: Why the Future of Government is up For Grabs and Who Will Take It.* In this book, I explore realignment theory. It argues that realignments are a poor concept that should be abandoned. As part of this analysis, I conducted a thorough analysis of demographic and political trends beginning in the 1920s and continuing through the modern times, noting the fluidity and fragility of the coalitions built by the major political parties and their candidates.

11. I co-authored the 2014 *Almanac of American Politics*. The Almanac is considered the foundational text for understanding congressional districts and the representatives of those districts, as well as the dynamics in play behind the elections. PBS's Judy Woodruff described the book as "the oxygen of the political world," while NBC's Chuck Todd noted that "[r]eal political junkies get two *Almanacs*: one for the home and one for the office." My focus was researching the history of and writing descriptions for many of the newly-drawn districts, including tracing the history of how and why they were drawn the way that they were drawn.

12. I have spoken on these subjects before audiences from across the political spectrum, including at the Heritage Foundation, the American Enterprise Institute, the CATO Institute, the Bipartisan Policy Center, and the Brookings Institution. In 2012, I was invited to Brussels to speak about American elections to the European External Action Service, which is the European Union's diplomatic corps. I was selected by the United States Embassy in Sweden to discuss the 2016 elections to a series of audiences there, and was selected by the United States Embassy in Spain to fulfil a similar mission in 2018. I was invited to present by the United States Embassy in Italy, but was unable to do so because of my teaching schedule.

13. In the winter of 2018, I taught American Politics and the Mass Media at Ohio Wesleyan University. I taught Introduction to American Politics at The Ohio State University for three semesters from Fall of 2018 to Fall of 2019. In the Springs of 2020 and 2021, I taught Political Participation and Voting Behavior at The Ohio State University. This course spent several weeks covering all facets of redistricting: How maps are drawn, debates over what constitutes a fair map, measures of redistricting quality, and similar topics.

14. It is my policy to appear on any major news outlet that invites me, barring scheduling conflicts. I have appeared on both Fox News and MSNBC to discuss electoral and

demographic trends. I have been cited in major news publications, including *The New York Times*, *The Washington Post*, *The Los Angeles Times*, *The Wall Street Journal*, and *USA Today*.

15. I sit on the advisory panel for the "States of Change: Demographics and Democracy" project. This project is sponsored by the Hewlett Foundation and involves three premier think tanks: The Brookings Institution, the Bipartisan Policy Center, and the Center for American Progress. The group takes a detailed look at trends among eligible voters and the overall population, both nationally and in key states, to explain the impact of these changes on American politics, and to create population projections, which the Census Bureau abandoned in 1995. In 2018, I authored one of the lead papers for the project: "In the Long Run, We're All Wrong," available at https://bipartisanpolicy.org/wp-content/uploads/2018/04/BPC-Democracy-States-of-Change-Demographics-April-2018.pdf.

16. I previously authored an expert report in *Dickson v. Rucho*, No. 11-CVS-16896 (N.C. Super Ct., Wake County), which involved North Carolina's 2012 General Assembly and Senate maps. Although I was not called to testify, it is my understanding that my expert report was accepted without objection. I also authored an expert report in *Covington v. North Carolina*, Case No. 1:15-CV-00399 (M.D.N.C.), which involved almost identical challenges in a different forum. Due to what I understand to be a procedural quirk, where my largely identical report from *Dickson* had been inadvertently accepted by the plaintiffs into the record when they incorporated parts of the *Dickson* record into the case, I was not called to testify.

17. I authored two expert reports in *NAACP v. McCrory*, No. 1:13CV658 (M.D.N.C.), which involved challenges to multiple changes to North Carolina's voter laws, including the elimination of a law allowing for the counting of ballots cast in the wrong precinct. I was

admitted as an expert witness and testified at trial. My testimony discussed the "effect" prong of the Voting Rights Act claim. I did not examine the issues relating to intent.

18. I authored reports in *NAACP v. Husted*, No. 2:14-cv-404 (S.D. Ohio), and *Ohio Democratic Party v. Husted*, Case 15-cv-01802 (S.D. Ohio), which dealt with challenges to various Ohio voting laws. I was admitted and testified at trial in the latter case (the former case settled). The judge in the latter case ultimately refused to consider one opinion, where I used an internet map-drawing tool to show precinct locations in the state. Though no challenge to the accuracy of the data was raised, the judge believed I should have done more work to check that the data behind the application was accurate.

19. I served as a consulting expert in *Lee v. Virginia Board of Elections*, No. 3:15-cv-357 (E.D. Va. 2016), a voter identification case. Although I would not normally disclose consulting expert work, I was asked by defense counsel to sit in the courtroom during the case and review testimony. I would therefore consider my work *de facto* disclosed.

20. I filed an expert report in *Mecinas v. Hobbs*, No. CV-19-05547-PHX-DJH (D. Ariz. 2020). That case involved a challenge to Arizona's ballot order statute. Although the judge ultimately did not rule on a motion in limine in rendering her decision, I was allowed to testify at the hearing.

21. I authored two expert reports in *Feldman v. Arizona*, No. CV-16-1065-PHX-DLR (D. Ariz.). Plaintiffs in that case challenged an Arizona law prohibiting the collection of voted ballots by third parties that were not family members or caregivers and the practice of most of the state's counties to require voters to vote in their assigned precinct. My reports and testimony were admitted. Part of my trial testimony was struck in that case for reasons unrelated to the merits of the opinion; counsel for the state elicited it while I was on the

witness stand and it was struck after Plaintiffs were not able to provide a rebuttal to the new evidence.

22. I authored an expert report in *Smith v. Perrera*, No. 55 of 2019 (Belize). In that case I was appointed as the court's expert by the Supreme Court of Belize. In that case I was asked to identify international standards of democracy as they relate to malapportionment claims, to determine whether Belize's electoral divisions (similar to our congressional districts) conformed with those standards, and to draw alternative maps that would remedy any existing malapportionment.

23. I authored expert reports in *A. Philip Randolph Institute v. Smith*, No. 1:18-cv-00357-TSB (S.D. Ohio), *Whitford v. Nichol*, No. 15-cv-421-bbc (W.D. Wisc.), and *Common Cause v. Rucho*, NO. 1:16-CV-1026-WO-JEP (M.D.N.C.), which were efficiency gap-based redistricting cases filed in Ohio, Wisconsin and North Carolina.

24. I also authored an expert report in the cases of *Ohio Organizing Collaborative, et al v. Ohio Redistricting Commission, et al* (No. 2021-1210); *League of Women Voters of Ohio, et al v. Ohio Redistricting Commission, et al* (No. 2021-1192); *Bria Bennett, et al v. Ohio Redistricting Commission, et al* (No. 2021-1198). These cases are pending in original action before the Supreme Court of Ohio.

25. I currently serve as one of two special masters appointed by the Supreme Court of Virginia to redraw the districts that will elect the commonwealth's representatives to the House of Delegates, state Senate, and U.S. Congress.

SUMMARY OF WORK PERFORMED

26. I certify that the images attached as Exhibit 2 are true and correct copies of images that I created and that I describe below.

27. To create these images, I first examined the Complaints filed by plaintiffs in this action. I examined whether districts were challenged as either partisan gerrymanders or districts that diluted minority voting power. If I determined a district was challenged, I coded it as a "1."

28. I then downloaded shapefiles for the enacted Congressional, State Senate and House of Representatives from the legislative redistricting website, https://www.ncleg.gov/Redistricting.

29. Using R, a widely utilized statistical programming tool with which I have extensive familiarity through work and coursework, I color-coded the districts by plaintiff group, based upon who challenged which districts. This produced the accompanying maps.

Exhibit 1

SEAN P. TRENDE
1146 Elderberry Loop
Delaware, OH 43015
strende@realclearpolitics.com

EDUCATION

Ph.D., The Ohio State University, Political Science, expected 2022.

M.A.S. (Master of Applied Statistics), The Ohio State University, 2019.

J.D., Duke University School of Law, *cum laude*, 2001; Duke Law Journal, Research Editor.

M.A., Duke University, *cum laude*, Political Science, 2001. Thesis titled *The Making of an Ideological Court: Application of Non-parametric Scaling Techniques to Explain Supreme Court Voting Patterns from 1900-1941*, June 2001.

B.A., Yale University, with distinction, History and Political Science, 1995.

PROFESSIONAL EXPERIENCE

Law Clerk, Hon. Deanell R. Tacha, U.S. Court of Appeals for the Tenth Circuit, 2001-02.

Associate, Kirkland & Ellis, LLP, Washington, DC, 2002-05.

Associate, Hunton & Williams, LLP, Richmond, Virginia, 2005-09.

Associate, David, Kamp & Frank, P.C., Newport News, Virginia, 2009-10.

Senior Elections Analyst, RealClearPolitics, 2009-present.

Columnist, Center for Politics Crystal Ball, 2014-17.

Gerald R. Ford Visiting Scholar, American Enterprise Institute, 2018-present.

BOOKS

Larry J. Sabato, ed., *The Blue Wave*, Ch. 14 (2019).

Larry J. Sabato, ed., *Trumped: The 2016 Election that Broke all the Rules* (2017).

Larry J. Sabato, ed., *The Surge:2014's Big GOP Win and What It Means for the Next Presidential Election*, Ch. 12 (2015).

Larry J. Sabato, ed., *Barack Obama and the New America*, Ch. 12 (2013).

Barone, Kraushaar, McCutcheon & Trende, *The Almanac of American Politics 2014* (2013).

The Lost Majority: Why the Future of Government is up for Grabs – And Who Will Take It (2012).

PREVIOUS EXPERT TESTIMONY

Dickson v. Rucho, No. 11-CVS-16896 (N.C. Super. Ct., Wake County) (racial gerrymandering).

Covington v. North Carolina, No. 1:15-CV-00399 (M.D.N.C.) (racial gerrymandering).

NAACP v. McCrory, No. 1:13CV658 (M.D.N.C.) (early voting).

NAACP v. Husted, No. 2:14-cv-404 (S.D. Ohio) (early voting).

Ohio Democratic Party v. Husted, Case 15-cv-01802 (S.D. Ohio) (early voting).

Lee v. Virginia Bd. of Elections, No. 3:15-cv-357 (E.D. Va.) (early voting).

Feldman v. Arizona, No. CV-16-1065-PHX-DLR (D. Ariz.) (absentee voting).

A. Philip Randolph Institute v. Smith, No. 1:18-cv-00357-TSB (S.D. Ohio) (political gerrymandering).

Whitford v. Nichol, No. 15-cv-421-bbc (W.D. Wisc.) (political gerrymandering).

Common Cause v. Rucho, No. 1:16-CV-1026-WO-JEP (M.D.N.C.) (political gerrymandering).

Mecinas v. Hobbs, No. CV-19-05547-PHX-DJH (D. Ariz.) (ballot order effect).

Fair Fight Action v. Raffensperger, No. 1:18-cv-05391-SCJ (N.D. Ga.) (statistical analysis).

Pascua Yaqui Tribe v. Rodriguez, No. 4:20-CV-00432-TUC-JAS (D. Ariz.) (early voting).

COURT APPOINTMENTS

Appointed as Voting Rights Act expert by Arizona Independent Redistricting Commission

Appointed redistricting expert by the Supreme Court of Belize in *Smith v. Perrera*, No. 55 of 2019 (one-person-one-vote).

INTERNATIONAL PRESENTATIONS AND EXPERIENCE

Panel Discussion, European External Action Service, Brussels, Belgium, *Likely Outcomes of 2012 American Elections.*

Selected by U.S. Embassies in Sweden, Spain, and Italy to discuss 2016 and 2018 elections to think tanks and universities in area (declined Italy due to teaching responsibilities).

Selected by EEAS to discuss 2018 elections in private session with European Ambassadors.

TEACHING

American Democracy and Mass Media, Ohio Wesleyan University, Spring 2018.

Introduction to American Politics, The Ohio State University, Autumn 2018, 2019, 2020, Spring 2018.

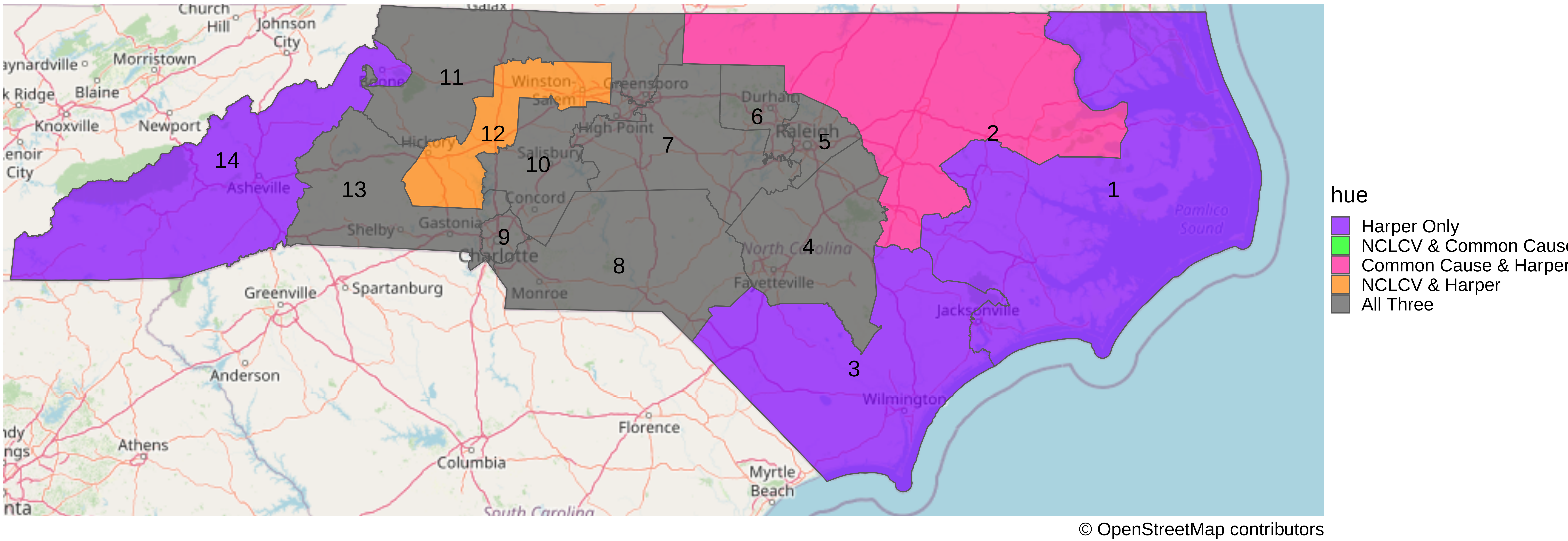
Political Participation and Voting Behavior, Spring 2020, Spring 2021.

REAL CLEAR POLITICS COLUMNS

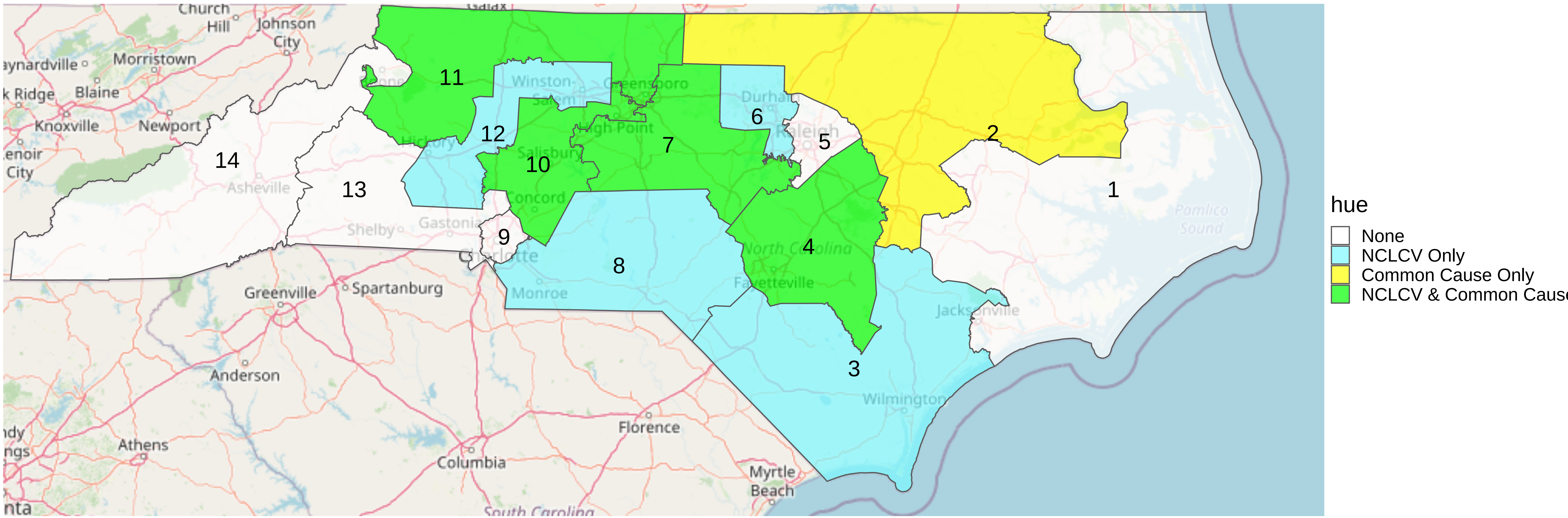
Full archives available at http://www.realclearpolitics.com/authors/sean_trende/

Exhibit 2

Congressional Districts Challenged As Political Gerrymanders, By Plaintiff Group

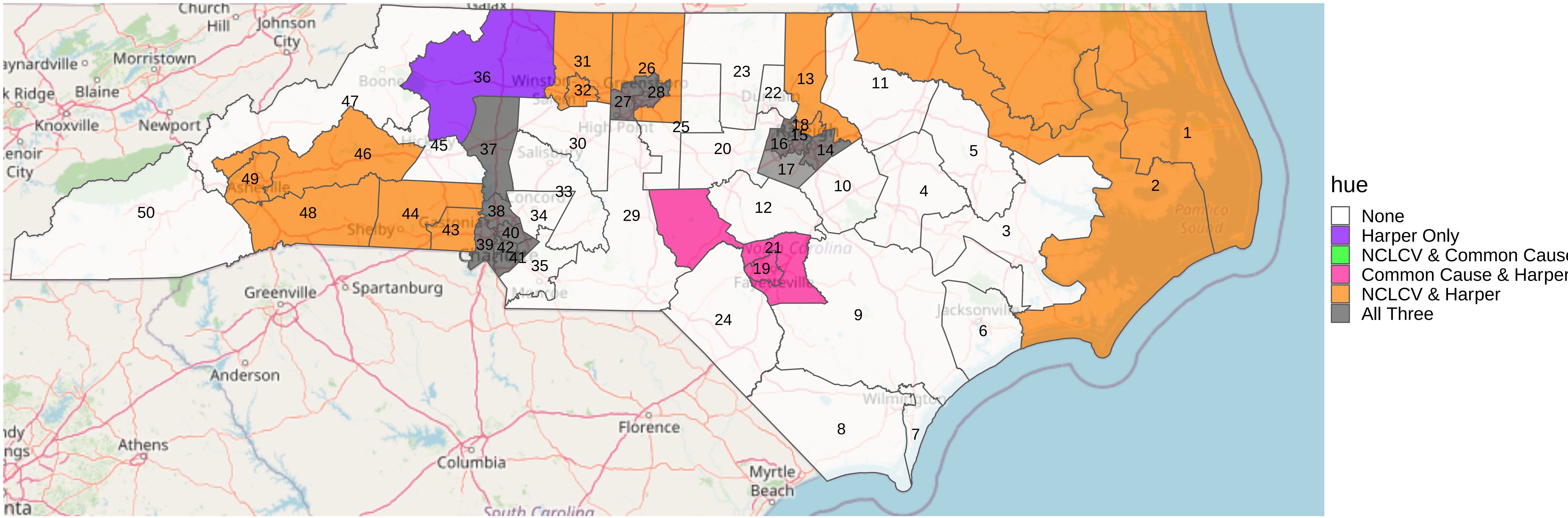


Congressional Districts Challenged In Racial Vote Dilution Claim, By Plaintiff Group



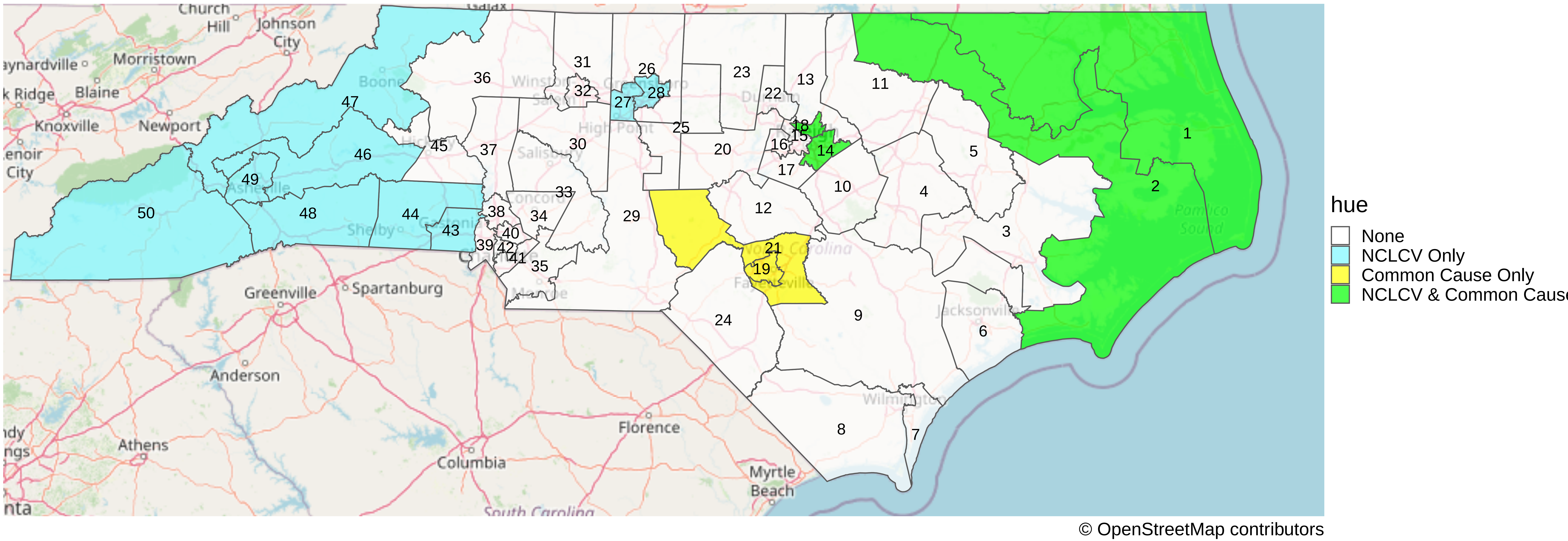
© OpenStreetMap contributors

State Senate Districts Challenged As Political Gerrymanders, By Plaintiff Group

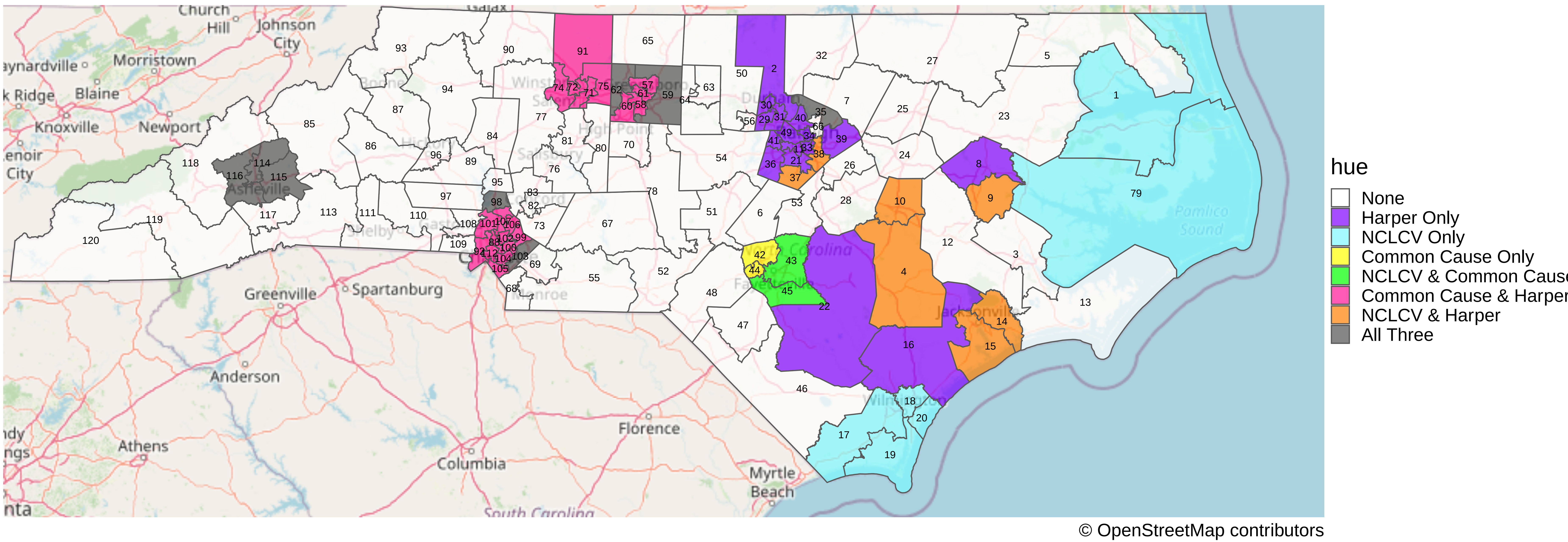


© OpenStreetMap contributors

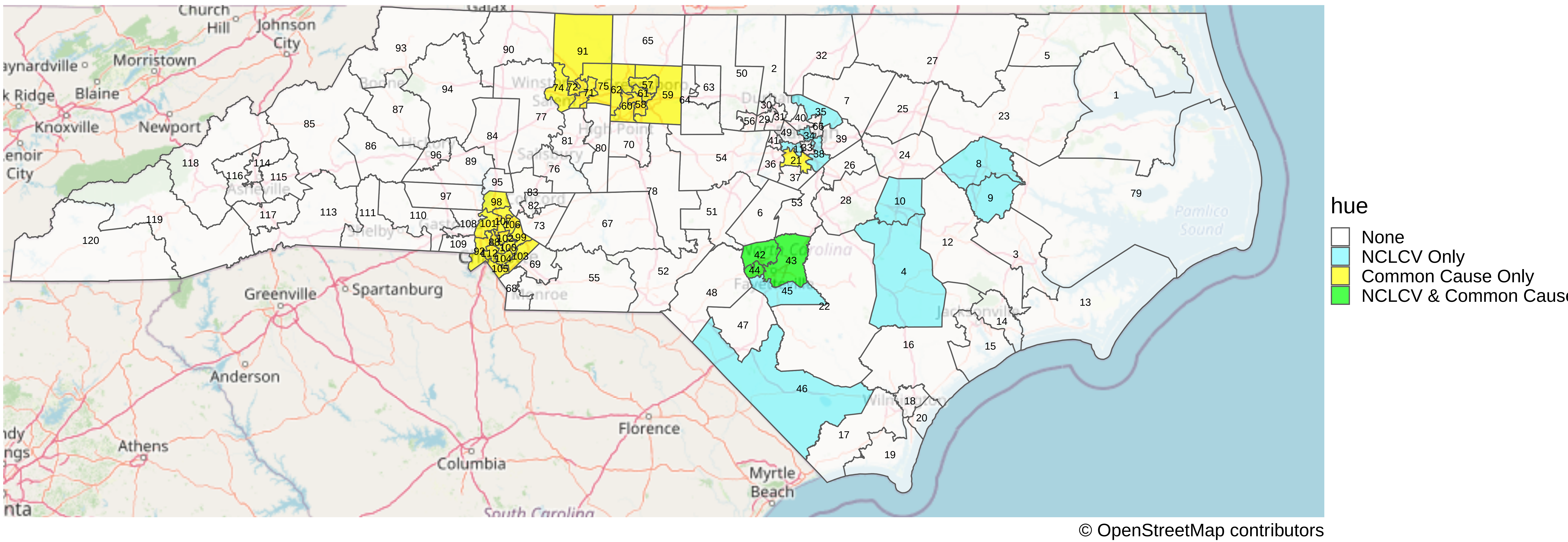
State Senate Districts Challenged In Racial Vote Dilution Claim, By Plaintiff Group



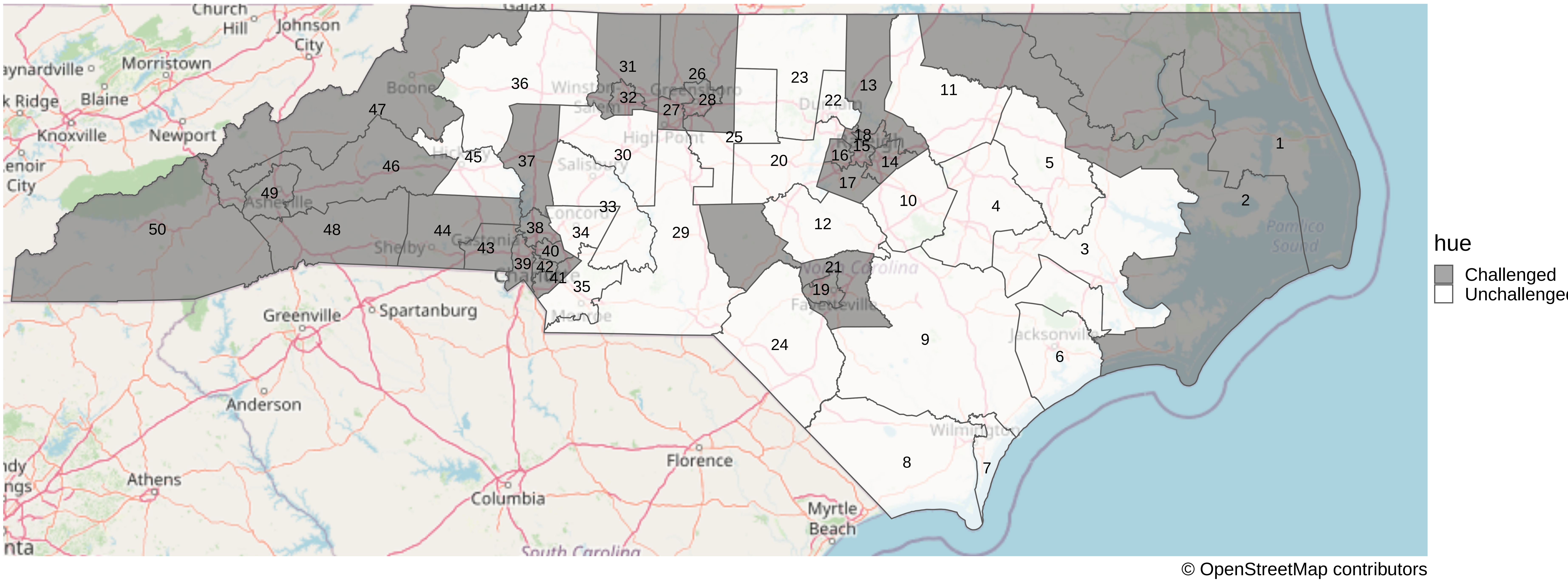
State House Districts Challenged As Political Gerrymanders, By Plaintiff Group



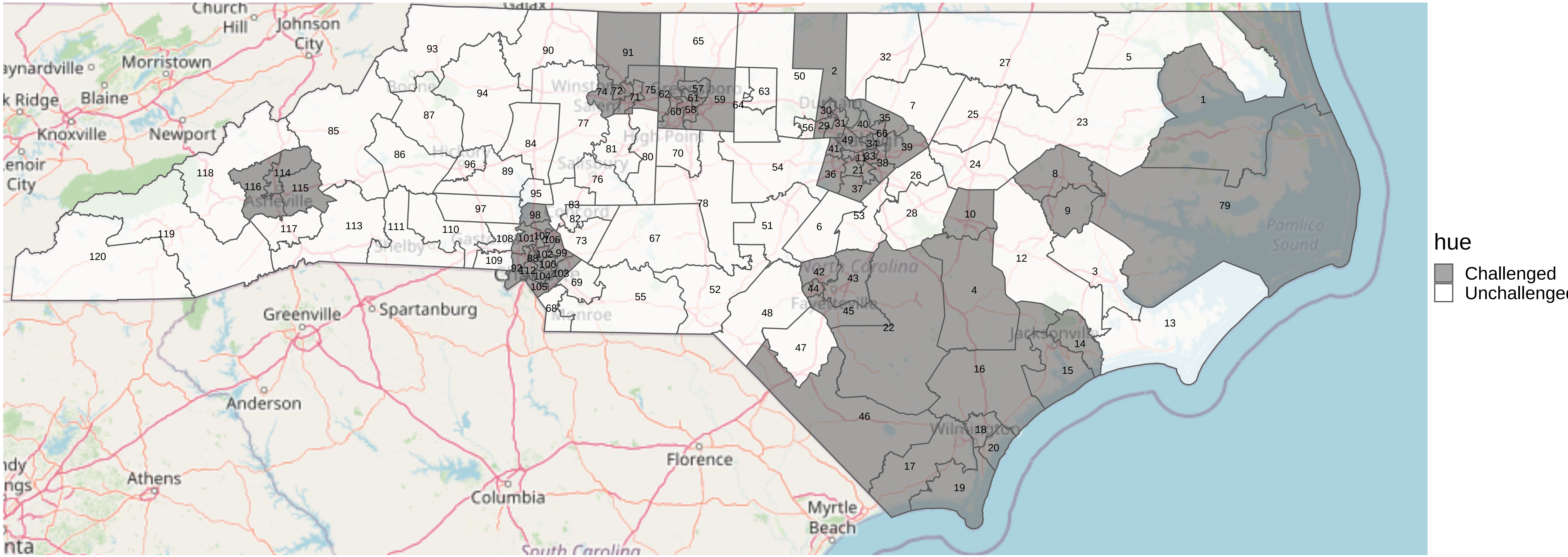
State House Districts Challenged In Racial Vote Dilution Claim, By Plaintiff Group



All State Senate Districts Challenged, By Plaintiff Group



All State House Districts Challenged, By Plaintiff Group



© OpenStreetMap contributors

Preliminary analysis of SL 2021-174 Congressional districting

Wesley Pegden

November 29, 2021

1 Qualifications

I am an associate professor in the department of Mathematical Sciences at Carnegie Mellon University, where I have been a member of the faculty since 2013. I received my Ph.D. in Mathematics from Rutgers University in 2010 under the supervision of József Beck, and I am an expert on stochastic processes and discrete probability. My research has been funded by the National Science Foundation and the Sloan Foundation. A list of my publications with links to online manuscripts is also available at my website at `http://math.cmu.edu/~wes`. I am an expert on the use of Markov Chains for the rigorous analysis of gerrymandering, and have published papers[1] developing techniques for this application in *Proceedings of the National Academy of Sciences* and *Statistics and Public Policy*, hereafter referred to by [CFP] and [CFMP], respectively.

I testified as an expert witness in the *League of Women Voters of Pennsylvania v. Commonwealth of Pennsylvania* case in which the 2011 Congressional districting was found to be an unconstitutional partisan gerrymander, and as well as the *Common Cause v. Lewis* case in North Carolina. I previously served as a member of the bipartisan Pennsylvania Redistricting Reform Commission under appointment by the governor.

2 Executive Summary

I was asked to conduct a preliminary analysis of whether the S.L. 2021-174 Congressional Districting passed in North Carolina drawn in a way which made extreme use of partisan considerations.

To conduct my analysis, I take the enacted plan as a starting point and make a sequence of many small random changes to the district boundaries. This methodology is intended to detect whether the district lines were carefully drawn to optimize partisan considerations; in particular, if the plans in question were not intentionally drawn to maximize partisan advantage, then making small random changes should not significantly decrease the plan's partisan bias.

Specifically, my method begins with the enacted plan and uses a Markov Chain—a sequence of random changes—to generate billions of comparison districtings against which I compare the enacted plans. These comparison districtings are generated by making a sequence of small random changes to the enacted plans themselves, and preserve districting criteria such as population deviation, compactness, and splitting of counties.

The analysis I conduct of the enacted plan using this data has two levels. The first level of my analysis consists simply of comparing the partisan properties of the enacted plans to the large sets of comparison maps produced by my Markov Chain, and I report how unusual the enacted plans are with respect to their partisan properties, against this comparison set. **Quantitatively, I find the enacted S.L. 2021-174 Congressional plan exhibits greater partisan bias than 99.99% of the billions of comparison districtings of North Carolina produced by my algorithm.**

[1]

- M. Chikina, A. Frieze, W. Pegden. Assessing significance in a Markov Chain without mixing, in *Proceedings of the National Academy of Sciences* **114** (2017) 2860–2864
- M. Chikina, A. Frieze, J. Mattingly, W. Pegden. Separating effect from significance in Markov chain tests, in *Statistics and Public Policy* **7** (2020) 101–114.

NCLCV v. Hall
21 CVS 15426
LDTX180

Exhibit #
Pegden 1
JH-12/30/2021
exhibitsticker.com

The next level of my analysis uses the mathematical results I have developed with my co-authors in [CFP] and [CFMP] to translate the results of the above comparison into a statement about how the enacted plans compare against *all* other districtings of North Carolina satisfying the districting criteria I consider in this report. In other words, the theorem that I use in the second level analysis allows me to compare the enacted plan against not only the billions of plans that my simulations produce through making small random changes, but also against all other possible districtings of North Carolina satisfying the districting criteria I consider.

Consider the following: when I make a sequence of small random changes to an enacted plan as described above, this can be viewed as a test of whether the partisan bias in the current districting is fragile, in the sense that it evaporates when the boundary lines of the district are perturbed. The theorems proved in [CFP] and [CFMP] establish that it is mathematically impossible for the political geography of a state to cause such a result. That is: while political geography might conceivably interact with districting criteria to create a situation where typical districtings of a state are biased in favor of one party, it is mathematically impossible for the political geography of a state to interact with districting criteria to create a situation where typical districtings of a state exhibit a *fragile* or *optimized* partisan bias, which quickly evaporates when small changes are made. This allows us to rigorously demonstrate that a districting is optimized with respect to partisanship, and is an outlier among *all* districtings of a state satisfying the criteria I consider, with respect to this property.

2.1 Comparison Criteria

The comparison districtings used by method are required to satisfy various criteria in ways that constrain them to be similar in several respects to the enacted map being evaluated. For the preliminary analysis, all comparison maps were constrained to have population deviation at most 2%, and to have compactness scores at good as the enacted map, up to an error of at most 2%, no more precinct splits than the enacted map, and no more county traversals than the enacted map. These restrictions are denoted “conditions A” in the results below. I also conducted three additional tests which additionally constrain the number of municipality splits (“conditions B”), additionally constrain incumbents protected by the enacted map to be protected by all comparison maps (“conditions C”), or additionally constrain both (“conditions D”).

2.2 Note on Population Deviation

My method does not simulate the results of elections for hypothetical elections at the per-person level, and thus do not enforce 1-person population deviation on districts (instead using a cutoff like 2%, as described above), as direct voter preference data is not available at sufficient granularity. Note that this same limitation faces mapmakers who might try to draw a favorable districting for their party; a practical approach is to first use the available data to draw a “coarse” map with the desired properties, and then make small changes to the map (e.g., which split VTDs) to satisfy the population constraint.

I verify that the distinction between 1-person and 2% population deviation do not drive the results of my analysis in two ways.

First, I simply redo my most constrained analysis (“Conditions D”) with a 1% population deviation constraint, and obtain similar results.

Second, I analyze a course VTD-level version of the enacted map (itself with nearly 2% population deviation), and show that even this coarse version of the enacted map is an extreme outlier with respect to partisan bias, before small changes are made to it to produce the enacted 1-person-deviation map. This demonstrates that the course VTD-level “blueprint” for the map is an extreme outlier, optimized for partisan considerations, among alternative VTD-level maps with similar population deviation, even before the small changes used to achieve 1-person deviation are accounted for.

These results are shown in Section 3.

2.3 Election data

The partisan characteristics of each of the billions of maps generated by my algorithm is compared to that of the enacted map through the lens of historical election data. I use the 2020 Attorney General race as a proxy for expected partisan voting patterns given knowledge available at the time the disputed plan was drawn.

2.4 Comparison metric

Using the election data indicated above, my analysis compares the partisanship of districtings according to **the average number of seats Republicans would expect to win in the districting**, based on a random uniform swing model with the historical voting data I use.

The *uniform swing* is a simple model frequently used to make predictions about the number of seats a party might win in an election, based on partisan voting data. Suppose, for example, that given data from a previous Congressional election in North Carolina, we would like to predict how many seats Republicans will win in an upcoming Congressional election with the same districting, assuming that at a statewide level, we expect them to outperform by 1.5 percentage points their results from the last election.

A uniform swing would simply add 1.5 percentage points to Republican performance in every district in data from the last election, and then evaluate how many seats would be won with these shifted voting outcomes.

When I am evaluating the partisanship of a comparison districting (to compare it to the enacted plan), I am interested in the number of seats we expect Republicans might win in the districting, given unknown shifts in partisan support. In particular, the metric I use is:

> How many seats, on average, would Republicans win in the given districting, if a random[2] uniform swing is applied to the historical voting data being used?

2.5 First level analysis

The first level of my analysis simply uses the procedure described above to generate a large set of comparison districtings against which one can compare the enacted plan. As discussed above, these comparison maps adhere to districting criteria in ways that constrain them to be similar in several respects to the enacted map being evaluated.

We will see below that in hundreds of runs of my algorithm, the enacted plan is found to be exhibit more partisan bias than 99.99% of comparison maps, i.e., it is among the most partisan 00.01% of found by the algorithm, since $100\% - 99.99\% = 00.01\%$.

The first level of my analysis simply reports the comparison of the enacted map to the comparison districtings produced in these runs. Even without applying the mathematical theorems we have developed in [CFP] and [CFMP], this gives strong, intuitively clear evidence of intent to create partisan bias in the districting: if the districting had not been drawn to carefully optimize its partisan bias, we would expect naturally that making small random changes to the districting would not have such a dramatic and consistent partisan effect.

2.6 Second level analysis

In the first level of my analysis, I compare enacted plans to comparison districtings produced by my algorithm (which makes random changes to the existing map while preserving districting criteria).

The next level of my analysis goes further than this, and enables a rigorous comparison to *all* alternative districtings of North Carolina satisfying the districting criteria I consider here. It does this by comparing how optimized for partisanship an evaluated plan is to how optimized alternative plans are.

2.6.1 Defining "optimized for partisanship"

Roughly speaking, when I say that a districting is *optimized for partisanship*, I mean that its partisan characteristics are highly sensitive to small random changes to the boundary lines.

[2] The random choice of my uniform swing is made from a normal distribution whose standard deviation is 4 percentage points, which is roughly the standard deviation of the swing in the past five North Carolina gubernatorial elections.

Formally, when I say that a districting is *optimized for partisanship* in this report, I mean that there is a high probability that when I make small random changes to the districting, its partisanship will be an extreme outlier among the comparison maps produced by the small random changes.

The yardstick I use to measure this property of a given map is the *ε-fragility* of a map. Given a small threshold ε like $\varepsilon = 00.01\%$, I can ask: what is the probability that when I make a sequence of small random changes to the map, the map will be in the most extreme ε fraction of maps encountered in the sequence of random changes? The probability of this occurrence is the ε-fragility of the map, and it is this probability that I use to quantify how optimized for partisanship a map is.

In other words, **one districting is considered more optimized for partisanship than another if it is more likely to have its partisan qualities consistently reduced when making a random sequence of small changes to its boundary lines.**

2.6.2 Comparing an enacted plan to the set of *all* alternatives

My analysis enables a rigorous comparison of an enacted plan to **all possible districting plans of the state** satisfying the districting criteria I consider, with respect to how optimized for partisanship the districtings are.

My method produces a rigorous p-value (statistical significance level) which precisely captures the confidence one can have in the findings of my "second level" analyses. In particular my second-level claims in this report are all valid at a statistical significance of $p = .002$. This means that the probability that I would report an incorrect number (for example, claiming that a districting is among the most optimized for partisanship 00.01% of all districtings, when in fact it is merely among the most 00.015% optimized for partisanship) is at most 00.2%. To put this in context, clinical trials seeking regulatory approval for new medications frequently target a significance level of $p = .05$ (5%), a much looser standard than I hold myself to in this report.

2.6.3 Some intuition for why this is possible

It should be emphasized that it may seem remarkable that I can make a rigorous quantifiable comparison to *all* possible districtings, without actually generating all such districtings; this is the role of our theorems from [CFP] and [CFMP], which have simple proofs which have been verified by the mathematical community.

To give some nontechnical intuition for why this kind of analysis is possible, these results roughly work by showing that in a very general sense, it is not possible for an appreciable fraction of districtings of a state to appear optimized for partisanship in the sense defined in Section 2.6.1. In other words, it is *mathematically impossible* for any state, with any political geography of voting preferences and any choice of districting criteria, to have the property that a significant fraction of the possible districtings of the state satisfying the chosen districting criteria appear optimized for partisanship (as measured by their ε-fragility).

2.7 Results

For each of the four conditions described in 2.1, I did $2^{35} \approx 34$ billion steps. In this section I give the first-level and second-level analyses of these results, along with the output of each run.

2.7.1 Conditions A

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999943%	9	99.999943%	17	99.99971%	25	99.9998%
2	99.999973%	10	99.999908%	18	99.999987%	26	99.9999953%
3	99.99978%	11	99.99972%	19	99.99992%	27	99.999962%
4	99.9998%	12	99.99933%	20	99.9994%	28	99.99964%
5	99.999901%	13	99.999927%	21	99.999988%	29	99.999979%
6	99.99967%	14	99.999962%	22	99.99904%	30	99.99964%
7	99.999985%	15	99.999983%	23	99.9999965%	31	99.9989%
8	99.999908%	16	99.99977%	24	99.999986%	32	99.999976%

- **First level analysis:** In *every* run, the districting was in the most partisan 00.0011% of districtings (in other words, 99.9989% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted Congressional districting is among the most optimized-for-partisanship 00.003% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.997% are less optimized for partisanship), measured by their ε-fragility for $\varepsilon = 00.0011\%$.

2.7.2 Conditions B

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999989%	9	99.9995%	17	99.999943%	25	99.9978%
2	99.9986%	10	99.99999981%	18	99.99982%	26	99.999915%
3	99.99962%	11	99.999955%	19	99.99929%	27	99.99957%
4	99.999901%	12	99.999959%	20	99.9985%	28	99.99998%
5	99.999914%	13	99.99988%	21	99.99945%	29	99.999972%
6	99.9999982%	14	99.9988%	22	99.99976%	30	99.999935%
7	99.99986%	15	99.999964%	23	99.99979%	31	99.99964%
8	99.999926%	16	99.9989%	24	99.999996%	32	99.999958%

- **First level analysis:** In *every* run, the districting was in the most partisan 00.0021% of districtings (in other words, 99.9979% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted Congressional districting is among the most optimized-for-partisanship 00.0063% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.9937% are less optimized for partisanship), measured by their ε-fragility for $\varepsilon = 00.0021\%$.

2.7.3 Conditions C

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999998%	9	99.999938%	17	99.999965%	25	99.9999941%
2	99.99964%	10	99.99982%	18	99.99945%	26	99.99982%
3	99.9978%	11	99.99987%	19	99.999924%	27	99.999957%
4	99.9995%	12	99.99984%	20	99.99987%	28	99.99984%
5	99.99998%	13	99.99921%	21	99.999956%	29	99.99987%
6	99.99979%	14	99.99961%	22	99.99949%	30	99.99955%
7	99.999979%	15	99.99972%	23	99.99962%	31	99.99988%
8	99.99982%	16	99.999921%	24	99.99938%	32	99.99984%

- **First level analysis:** In *every* run, the districting was in the most partisan 00.0022% of districtings (in other words, 99.9978% were less partisan, in *every* run).

- **Second level analysis:** My theorems imply that the enacted Congressional districting is among the most optimized-for-partisanship 00.0065% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.9935% are less optimized for partisanship), measured by their ε-fragility for $\varepsilon = 00.0022\%$.

2.7.4 Conditions D

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9997%	9	99.99976%	17	99.99958%	25	99.99979%
2	99.99989%	10	99.999924%	18	99.9999942%	26	99.999986%
3	99.99962%	11	99.99982%	19	99.99963%	27	99.9978%
4	99.99976%	12	99.9999986%	20	99.9999983%	28	99.99969%
5	99.99988%	13	99.99979%	21	99.99954%	29	99.9995%
6	99.99958%	14	99.999986%	22	99.999904%	30	99.999984%
7	99.999986%	15	99.99954%	23	99.99989%	31	99.999955%
8	99.999956%	16	99.999965%	24	99.99971%	32	99.999962%

- **First level analysis:** In *every* run, the districting was in the most partisan 00.0022% of districtings (in other words, 99.9978% were less partisan, in *every* run).

- **Second level analysis:** My theorems imply that the enacted Congressional districting is among the most optimized-for-partisanship 00.0065% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.9935% are less optimized for partisanship), measured by their ε-fragility for $\varepsilon = 00.0022\%$.

3 Conclusion

Based on my analysis, I find the enacted S.L. 2021-174 Congressional plan is optimized for Republican partisan bias to an extreme degree, moreso than 99.99% of all alternative districtings satisfying the criteria I examined in this report.

Appendix: Population deviation analysis

In this section we show results from running our algorithm under conditions discussed in Section 2.2.

First, we use the most restrictive "Conditions D" but impose a requirement of $\leq 1\%$ population deviation, obtaining the following results:

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9986%	9	99.99947%	17	99.9975%	25	99.99907%
2	99.99939%	10	99.99987%	18	99.999928%	26	99.99969%
3	99.999961%	11	99.99958%	19	99.99973%	27	99.99984%
4	99.99923%	12	99.9999969%	20	99.99929%	28	99.9996%
5	99.99963%	13	99.9999%	21	99.99916%	29	99.999998%
6	99.9998%	14	99.99989%	22	99.99922%	30	99.99983%
7	99.9989%	15	99.99982%	23	99.9988%	31	99.998%
8	99.999911%	16	99.9988%	24	99.99934%	32	99.99945%

Next, we run our algorithm on a coarse "whole-precinct" version of the enacted map. This is the districting obtained by assigning each split VTD to the district with which its intersection is greatest, and is a coarse starting point from which one can obtain a 1-person deviation map by carefully splitting VTD's. Its population deviation from ideal is 1.8%. In the results below, we see that this coarse version of the enacted map also exhibits extreme partisan bias, demonstrating that the appearance of partisan bias is not created by the maps adherence to strict constraints on population deviation.

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99937%	9	99.99942%	17	99.99942%	25	99.99939%
2	99.99949%	10	99.99917%	18	99.9997%	26	99.99941%
3	99.9989%	11	99.99942%	19	99.99988%	27	99.99992%
4	99.99921%	12	99.9989%	20	99.99987%	28	99.99986%
5	99.9982%	13	99.99926%	21	99.99976%	29	99.99981%
6	99.99924%	14	99.999904%	22	99.99969%	30	99.999903%
7	99.9995%	15	99.99972%	23	99.99904%	31	99.99954%
8	99.99976%	16	99.9996%	24	99.99976%	32	99.99951%

I hereby certify that the foregoing statements are true and correct to the best of my knowledge, information, and belief.

Wesley Pegden
11/29/21

PEGDEN 2

An analysis of North Carolina's legislative districtings: Expert Report

Wesley Pegden

December 23, 2021

Contents

NCLCV v. Hall
21 CVS 15426
LDTX181

Exhibit #
Pegden 2
JH-12/30/2021
exhibitsticker.com

1 Qualifications

I am an associate professor in the department of Mathematical Sciences at Carnegie Mellon University, where I have been a member of the faculty since 2013. I received my Ph.D. in Mathematics from Rutgers University in 2010 under the supervision of József Beck, and I am an expert on stochastic processes and discrete probability. My research has been funded by the National Science Foundation and the Sloan Foundation. A current CV with a list of publications is attached as Exhibit A. A list of my publications with links to online manuscripts is also available at my website at `http://math.cmu.edu/~wes`.

I am an expert on the use of Markov Chains for the rigorous analysis of gerrymandering, and have published papers[1] developing techniques for this application in *Proceedings of the National Academy of Sciences* and *Statistics and Public Policy*, hereafter referred to by [CFP] and [CFMP], respectively.

I testified as an expert witness in the *League of Women Voters of Pennsylvania v. Commonwealth of Pennsylvania* case in which the 2011 Congressional districting was found to be an unconstitutional partisan gerrymander, and as well as the *Common Cause v. Lewis* case in North Carolina. I previously served as a member of the bipartisan Pennsylvania Redistricting Reform Commission under appointment by the governor. I am being compensated at a rate of $325 per hour for my work on the current case.

2 Executive Summary

I was asked to analyze whether the proposed Congressional, state House, and state Senate districtings of North Carolina were drawn in a way which made extreme use of partisan considerations.

To conduct my analysis, I take the enacted plan as a starting point and make a sequence of many small random changes to the district boundaries. This methodology is intended to detect whether the district lines were carefully drawn to optimize partisan considerations; in particular, if the plans in question were not intentionally drawn to maximize partisan advantage, then making random changes should not significantly decrease the plan's partisan bias.

Specifically, my method begins with the enacted plan and uses a Markov Chain—a sequence of random changes—to generate trillions of comparison districtings against which I compare the enacted plans. These comparison districtings are generated by making a sequence of small random changes to the enacted plans themselves, and preserve districting criteria such as population deviation, compactness, and splitting of counties, municipalities, and precincts, among other criteria (a complete list is given in Section 4.3.1).

The analysis I conduct of the enacted plan using this data has two levels. The first level of my analysis consists simply of comparing the partisan properties of the enacted plans to the large sets of comparison maps produced by my Markov Chain, and I report how unusual the enacted plans are with respect to their partisan properties, against this comparison set. **Quantitatively, for the enacted Congressional, House, and Senate plans, I find that they have a greater partisan bias than** 99.99999%**,** 99.99999%**, and** 99.97% **of the trillions of districtings produced by my algorithm, respectively.**

The next level of my analysis uses the mathematical theorems I have developed with my co-authors in [CFP] and [CFMP] to translate the results of the above comparison into a statement about how the enacted plans compare against *all* other districtings of North Carolina satisfying the districting criteria I consider in this report. In other words, the theorem that I use in the second level analysis allows me to compare the enacted plan against not only the trillions of plans that my simulations produce through making small random changes, but also against all other possible districtings of North Carolina satisfying the districting criteria I consider.

Consider the following: when I make a sequence of small random changes to an enacted plan as described above, this can be viewed as a test of whether the partisan bias in the current districting is fragile, in the sense that it evaporates when the boundary lines of the district are perturbed. As discussed in Section B, our

[1]

- M. Chikina, A. Frieze, W. Pegden. Assessing significance in a Markov Chain without mixing, in *Proceedings of the National Academy of Sciences* **114** (2017) 2860–2864
- M. Chikina, A. Frieze, J. Mattingly, W. Pegden. Separating effect from significance in Markov chain tests, in *Statistics and Public Policy* **7** (2020) 101–114.

theorems in [CFP] and [CFMP] establish that it is mathematically impossible for the political geography of a state to cause such a result. That is: while political geography might conceivably interact with districting criteria to create a situation where typical districtings of a state are biased in favor of one party, it is mathematically impossible for the political geography of a state to interact with districting criteria to create a situation where typical districtings of a state appear to be *optimized for partisan bias*, in the sense that their bias is fragile and evaporates when small random changes are made. This allows us to rigorously demonstrate that a districting is optimized for partisanship, and is an outlier among *all* districtings of a state satisfying the criteria I consider, with respect to this property.

Quantitatively, my second-level analysis establishes that the enacted plans here are more optimized for partisanship than 99.9999% of all possible Congressional districtings satisfying the districting criteria I account for in my analysis, more than 99.9999% of all possible House districtings satisfying those criteria, and more than 99.9% of all Senate districtings satisfying those criteria. Thus the chance of drawing districtings that are as optimized with respect to their partisan properties as the current House and Senate districtings of North Carolina *without* using partisan considerations is exceedingly small.

In particular, I find that **North Carolina's Congressional, House and Senate districtings were drawn in a way which made extreme use of partisan considerations, a finding which is mathematically impossible to be caused by the interaction of political geography and the districting criteria I consider.**

3 Topic of Expert Report

The question motivating my analysis in this case is: "*How significant a role did partisanship play in the drawing of the enacted Congressional, House and Senate districts of North Carolina?*"

My analysis approaches this question in a rigorous and quantifiable way. In short, I identify how much of an outlier the present districting lines are, with respect to how carefully they are drawn to line up with partisan goals. *A priori*, it is possible that political geography might conceivably interact with districting criteria to bias typical districtings for one party or another. But my analysis provides a rigorous quantifiable answer to the question of the extent to which partisanship was used in the districting process, whose validity *does not depend on the political geography of North Carolina.*

Apart from whole-state analyses of the enacted Congressional, House and Senate plans of North Carolina, I was also asked to conduct separate analyses of the following specific House and Senate clusters:

House:

- Mecklenburg
- Wake
- Forsyth-Stokes
- Guilford
- Buncombe
- Pitt
- Duplin-Wayne
- Alamance
- Durham-Person
- Cumberland
- Cabarrus-Davie-Rowan-Yadkin
- Brunswick-New Hanover

Senate:

- Iredell-Mecklenburg
- Granville-Wake
- Forsyth-Stokes
- Cumberland-Moore
- Guilford-Rockingham

4 Quantifying intentional and excessive use of partisanship

My approach begins with a simple idea: I make small random changes to the boundaries of enacted plans (while maintaining districting criteria) and study the effect this has on the partisan bias of the map. More specifically:

- I begin from the enacted plan I am evaluating, and then repeatedly:
  1. Randomly select a geographical unit (e.g., a voting precinct) on the boundary of two districts, and check: if I change which district this geographic unit belongs to, will the resulting districting still satisfy the districting criteria laid out in Section 4.3.1? If so, I make the change.
  2. Using historical voting data as a proxy for partisan voting patterns, evaluate the partisanship of the districting resulting from the previous step.
- These two steps are repeated many times, resulting in a sequence of districtings, each produced by a small random change to the districting preceding it, with the enacted map I am evaluating as the starting point for the sequence.

This procedure is implemented as a computer algorithm which carries out trillions of the above steps for a districting map.

4.1 First level analysis

The first level of my analysis simply uses the above procedure to generate a large set of comparison districtings against which one can compare the enacted plan. For example, for the Congressional districting, I conducted 32 runs of the above procedure. A "run" in this context consists of a single consecutive sequence of small random changes to the enacted plan, producing a set of comparison districtings. For example, for the Congressional districting, each run consisted of carrying out Steps 1 and 2 in the procedure above $2^{40} \approx 1$ trillion times. As discussed in later sections, these comparison maps adhere to districting criteria in ways that constrain them to be similar in several respects to the enacted map being evaluated. For example, the comparison districtings will preserve the same counties and municipalities preserved by the enacted plan.

In total for this districting, I conducted 32 such runs. I then show the results of these runs in a table, like this:

Congressional districting

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999947%	9	99.9999909%	17	99.9999955%	25	99.999995%
2	99.999968%	10	99.99999966%	18	99.9999973%	26	99.9999961%
3	99.9999988%	11	99.9999943%	19	99.99999972%	27	99.99999977%
4	99.99999931%	12	99.999988%	20	99.9999999981%	28	99.99999979%
5	99.99999999927%	13	99.999988%	21	99.9999999962%	29	99.9999981%
6	99.9999959%	14	99.9999987%	22	99.99999919%	30	99.9999941%
7	99.99999984%	15	99.999996%	23	99.9999908%	31	99.99999901%
8	99.9999999947%	16	99.999985%	24	99.999981%	32	99.9999969%

For example, we see here that in the first run, 99.9999947% of the comparison districtings exhibited less Republican bias than the enacted Congressional districting. Moreover, in *every* run, more than 99.999968% of the comparison districtings exhibited less Republican bias than the enacted plan.

The first level of my analysis simply reports this comparison of the enacted map to the comparison districtings produced in these runs. Even without applying the mathematical theorems we have developed in [CFP] and [CFMP], this gives strong, intuitively clear evidence that the district lines were intentionally drawn to optimize partisan advantage in the enacted plan: if the districting had not been drawn to carefully optimize its partisan bias, we would expect naturally that making small random changes to the districting would not have such a dramatic and consistent partisan effect.

4.2 Second level analysis

In the first level of my analysis, I compare enacted plans to comparison districtings produced by my algorithm (which makes random changes to the existing map while preserving districting criteria).

The next level of my analysis goes further than this, and enables a rigorous comparison to *all* alternative districtings of North Carolina satisfying the districting criteria I consider here. It does this by comparing how "optimized for partisanship" an evaluated plan is to how "optimized for partisanship" alternative plans are.

4.2.1 Defining "optimized for partisanship"

Roughly speaking, when I say that a districting is *optimized for partisanship*, I mean that its partisan characteristics are highly sensitive to small random changes to the boundary lines.

Formally, when I say that a districting is *optimized for partisanship* in this report, I mean that there is a high probability that when I make small random changes to the districting, its partisanship will be an extreme outlier among the comparison maps produced by the small random changes.

The yardstick I use to measure this property of a given map is the *ε-fragility* of a map. Given a small threshold ε—for example, 00.000031%, for the analysis of the Congressional districting given above—I can ask: what is the probability that when I make a sequence of small random changes to the map, the map will be in the most extreme ε fraction of maps encountered in the sequence of random changes? The probability of this occurrence is the ε-fragility of the map, and it is this probability that I use to quantify how optimized for partisanship a map appears to be.

In other words, **one districting is considered more optimized for partisanship than another if it is more likely to have its partisan bias consistently reduced when making a random sequence of small changes to its boundary lines.**

4.2.2 Comparing an enacted plan to the set of *all* alternatives

My analysis enables a rigorous comparison of an enacted plan to **all possible districting plans of the state** satisfying the districting criteria I consider, with respect to how optimized for partisanship the districtings are. I can report the maximum fraction of all such possible redistricting plans which could appear as optimized for partisanship as the enacted plan, in the sense of the test described above. For example, I report that the enacted Congressional districting of North Carolina is among the most optimized-for-partisanship 00.000031% of **all possible House districtings of North Carolina** satisfying the districting criteria I consider here, as measured by it's ε-fragility.

My method produces a rigorous p-value (statistical significance level) which precisely captures the confidence one can have in the findings of my "second level" analyses. In particular, for my statewide analyses, my second-level claims are all valid at a statistical significance of $p = .002$. This means that the probability that I would report an incorrect number (for example, claiming that a districting is among the most optimized-for-partisanship 00.01% of all districtings, when in fact it is merely among the most 00.015% optimized-for-partisanship) is at most 00.2%. To put this in context, clinical trials seeking regulatory approval for new medications frequently target a significance level of $p = .05$ (5%), a looser standard of statistical significance than I hold myself to in this report.

4.2.3 Some intuition for why this is possible

It may seem remarkable that I can make a rigorous quantifiable comparison to *all* possible districtings, without actually generating all such districtings; this is the role of our theorems from [CFP] and [CFMP], which have simple proofs which have been verified by the mathematical community.

To give some nontechnical intuition for why this kind of analysis is possible, these results roughly work by showing that in a very general sense, it is not possible for an appreciable fraction of districtings of a state to appear optimized for partisanship in the sense defined in Section 4.2.1. In other words, it is *mathematically impossible* for any state, with any political geography of voting preferences and any choice of districting criteria, to have the property that a significant fraction of the possible districtings of the state satisfying the chosen districting criteria appear optimized for partisanship (as measured by their ε-fragility).

4.3 Implementation details

Here I specify the particulars of the random changes my algorithm makes to a map, my implementation of districting criteria, and my method of comparing the partisanship of a districting to that of districtings encountered on the sequence of random changes.

4.3.1 Districting criteria

All comparison maps produced by my algorithm are required to satisfy the following districting criteria:

(a) **Contiguity**: I require comparison districtings to contain only contiguous districts.

(b) **Compact districts**: I require comparison districtings to be at least as compact as the enacted plan being evaluated, up to an error of 5%. Districting compactness is quantified by taking the average, over each district, of the ratio of the perimeter squared to the area (Polsby-Popper reciprocal).

(c) **County clusters**: For the House and Senate plans, I require comparison maps to respect the same county clustering as used by the enacted House and Senate plans.

(d) **Country traversals**: I require comparison districts to not contain more county traversals than the enacted plan. Additionally, I constrain the total length of all district boundary which is not also county boundary to be at most that of the enacted map, up to an error of 5%.

(e) **Municipality preservation:** There are at most as many municipal splits as in the enacted plan.

(f) **VTD preservation:** The total number of VTD splits in comparison districtings must not exceed the total number of VTD splits in the enacted plan.

(g) **Incumbency protection:** Any incumbent who, in the enacted plan, is not paired with any other incumbent must remain unpaired in the comparison districtings.

(h) **Population deviation**: For House and Senate districtings, I require comparison districtings to have district populations within 5% of the ideal district population. For the Congressional districting, I use a 2% threshold in my main analysis. I discuss robustness of my Congressional analysis to differences in population criteria in Section 5.0.2. Population is measured by the 2020 decennial Census.

4.3.2 A conservative application of the criteria

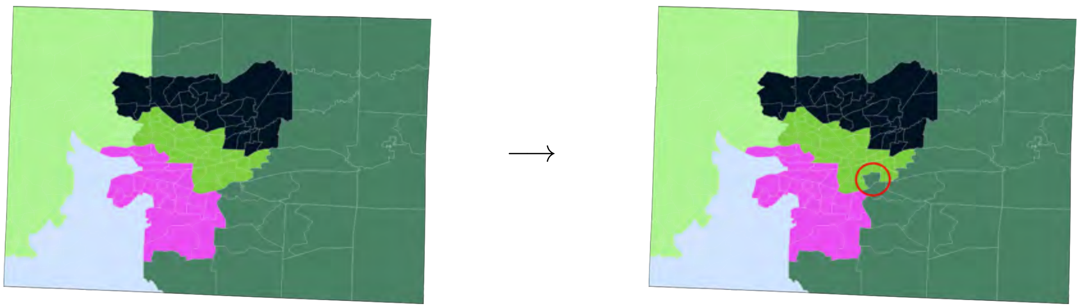
It is important to note that my analysis is designed to avoid second-guessing the mapmakers' choices in how they implemented the districting criteria. In particular, while it is reasonable to ask whether the mapmakers could have drawn districtings which adhered better to nonpartisan criteria (more compact, preserving more municipalities, *etc*), my approach is different, and much more conservative.

In particular, my analysis asks the question: even if we accept that the mapmakers have made appropriate choices with respect to nonpartisan criteria such as compactness, population deviation, municipality preservation, incumbency protection, and so on, does their plan nevertheless stand out with respect to its *partisan* qualities?

Note that, for example, I choose my compactness threshold within 5% of value of the enacted map. And with respect to incumbents, I do not try to protect as many incumbents as are protected in the enacted map, but exactly the same incumbents as protected by the mapmakers. With respect to municipality preservation, I am not trying to answer the question: "if the mapmakers had tried to preserve more municipalities, would this have resulted in a more favorable districting for Democrats?" Instead, I am asking, among all alternative districtings of North Carolina with the same *nonpartisan* characteristics as the enacted map—their compactness, how many municipalities they preserve, etc.—whether the enacted plan is an extreme outlier with respect to the extent to which it is optimized for partisanship.

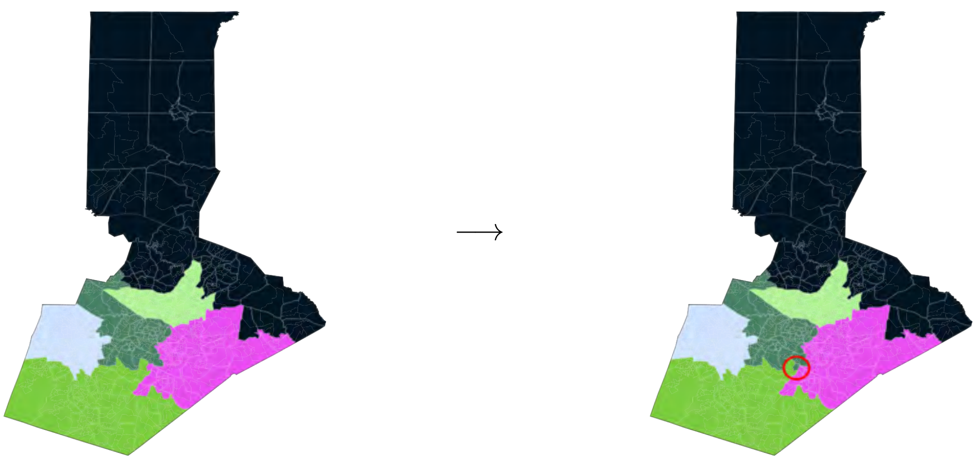
5 Random Changes

As described earlier, my method involves making small random changes to a map. For example, depicted here is a small random change made to the enacted House districting within the Guilford county cluster:



The geographical units used for these small random changes in this district are voting tabulation districts—VTDs. In particular, at each step of the sequence of random changes for the house districting within Guilford county, I move a randomly VTD that is at the boundary of two districts from one of those districts to the other (unless it would violate the constraints laid out in Section 4.3.1.

For House and Senate clusters that split VTDs, my analysis operates below the VTD level. In particular, my procedure in these case manipulates sub-VTD units (referred to hereafter as geounits). These are compact combinations of Census Blocks which respect VTD and district lines and contain on average approximately 1000 people. In particular, there are an average of around 4 geounits per VTD. In the following example from the Granville-Wake senate districting, we see an example of a random change at the geounit level:



The thick white lines here indicate current VTD boundaries. A geounit within an already broken VTD has changed district membership. When analyzing any districting at the below-VTD level, my algorithm constrains comparison maps to split at most as many VTDs as the enacted map.

For my whole-state analyses, my algorithm operates at the VTD level. This means that the algorithm is prohibited from splitting any VTD's not split in the enacted map. In Section E, I include runs where the Congressional districting is analyzed at the geounit level.

In each run, my chain generates comparison maps from a given enacted plan by making billions or trillions of these small changes to the enacted plan, while preserving districting criteria in specific ways chosen by the mapmakers, as discussed in Section 4.3.2.

These random changes can be either be made one-at-a-time or with several steps made simultaneously; the latter allows comparison maps to be generated when any single move would lead to a violation of the constraints laid out in Section 4.3.1 (e.g., because population would become too imbalanced), but combinations of moves can be found which would preserve all these criteria. My mathematical analysis applies equally well when using these "multi-move swaps" and I could analyze all clusters in this way if I wanted to, but the algorithm is slower in this mode. In general, in the interest of efficiency, I conduct all state-level analysis with single-move swaps, cluster-level VTD-level runs with multi-move swaps, and cluster-level geounit runs with single-move swaps, but additionally use multi-move swaps any time it enables the algorithm to generate more comparison maps.

Technical details of my implementation of these multi-moves are found in Appendix A. A related implementation detail for VTD splitting is also discussed there.

5.0.1 The *seats expected* metric for comparing districtings

As described in Section 4.2.1, my definition of optimized for partisanship involves comparing the partisanship of an enacted plan to the partisanship of comparison districtings produced from it by a sequence of random changes. Here I describe the *seats expected* metric of partisanship I use for this comparison throughout this report. In short, the seats expected metric for the districting is **the average number of seats Democrats would expect to win in the districting**, based on a uniform swing model with the historical voting data I use.

The *uniform swing* is a simple model frequently used to make predictions about the number of seats a party might win in an election, based on partisan voting data. Suppose, for example, that given data from the last North Carolina House election, we would like to predict how many seats Democrats will win in an upcoming House election (with the same districting), assuming that at a statewide level, we expect them to outperform by 1.5 percentage points their results from the last election.

A uniform swing would simply add 1.5 percentage points to Democrat performance in every district in data from the last election, and then evaluate how many seats would be won with these shifted voting outcomes.

When I am evaluating the partisanship of a comparison districting (to compare it to the enacted plan), I am interested in the number of seats we expect Democrats might win in the districting, given unknown shifts in partisan support. In particular, the metric I use is:

> How many seats, on average, would Democrats win in the given districting, if a random uniform swing is applied to the historical voting data being used?

As an example, let us consider the enacted Congressional plan, using the 2020 Attorney General election as a proxy for partisan voting patterns. Using these results as a direct proxy for future voting patterns, the enacted map would produce a 4:10 split of Democrat:Republican seats. If the Democrat vote share was increased by 1.68% in every district, the split would change to 5:9, and if it was increased by 3.05%, the split would rise to 6:8.

The random choice of my uniform swing is made from a normal distribution whose standard deviation is 4 percentage points, which is roughly the standard deviation of the swing in the past five North Carolina gubernatorial elections. The Figure 1 visualizes the probabilities that this distribution assigns to the various seat splits which would arise from the enacted Congressional map under uniform swings of the 2020 Attorney General election:

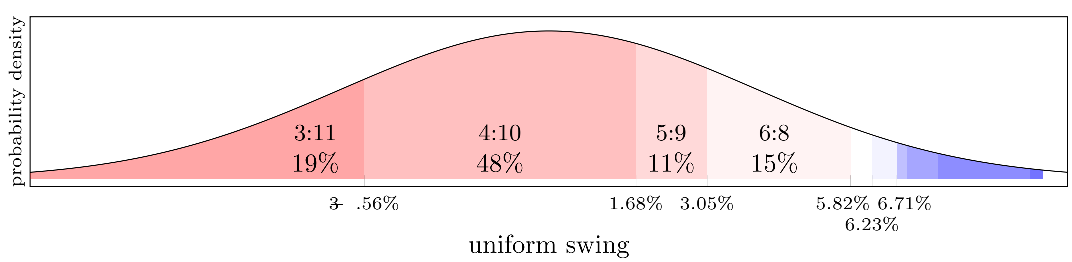


Figure 1: A normally distributed uniform swing applied to the enacted Congressional districting.

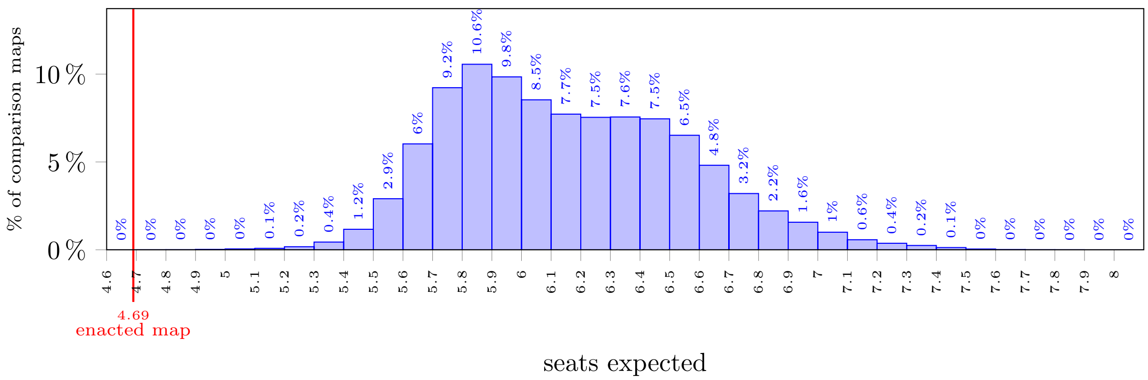
In particular, we can list the probability of any number of Democratic seats for the enacted Congressional plan according to this uniform swing model using the 2020 Attorney General race:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0.0%	0.0%	0.0%	19%	48%	11%	15%	1.3%	1.3%	0.1%	0.5%	1.2%	2.0%	0.1%	0.9%

The weighted average of these seat outcomes is computed as

$$.19 \times 3 + .48 \times 4 + .11 \times 5 + .15 \times 6 + .013 \times +.013 \times 8 + .001 \times 9 + .005 \times 10 + .012 \times 11 + .02 \times 12 + .001 \times 13 + .009 \times 14 = 4.69. \quad (1)$$

This "seats expected" number for the Congressional plan shows up in our analysis page for the Congressional districting (page 13), in a histogram we reproduce here for the purpose of illustration:



It is important to note that **my method does not evaluate the fairness of a districting by whether it produces a "small" or "large" number of seats for one party, or whether the uniform swing score calculated in this way is lower or higher than would be expected in a system of proportional representation**. Instead, this score is merely a metric used to **compare** one map to another. The only way these scores are used in my method is to evaluate which of two maps may be more advantageous to a particular political party, and when I find that a districting made extreme use of partisan consideration, it means that the enacted map is extreme outlier with respect to how optimized for partisanship it is **compared to the set of alternative comparison districtings of North Carolina** satisfying the districting criteria I impose.

5.0.2 Note on Population Deviation

My method does not simulate the results of hypothetical elections at the per-person level, and I do not enforce 1-person population deviation on Congressional districts. Instead, I use a cutoff 2%, as described above. I verify that the distinction between 1-person and 2% population deviation do not drive the results of my analysis in two ways.

First, in Section E, I show a run my whole Congressional analysis exactly the same way but with a 1% population deviation constraint and obtain similar results. I also show a geounit-level analysis which operates at just 0.5% population deviation and still finds the enacted plan to be an extreme outlier.

Second, I analyze a coarse VTD-level version of the enacted map (itself with nearly 2% population deviation), and show that even this coarse version of the enacted map is an extreme outlier with respect to partisan bias, before small changes are made to it to produce the enacted 1-person-deviation map. This demonstrates that the coarse VTD-level "blueprint" for the map is an extreme outlier, optimized for partisan considerations, among alternative VTD-level maps with similar population deviation, even before the small changes used to achieve 1-person deviation are accounted for.

Finally, I note that by design, the seats-expected metric I use is not sensitive to the kinds of small changes that need to be made to districts to equalize population. This can already be seen by comparing the seats-expected metric for the enacted Congressional plan to the "VTD-level blueprint" version we analyze in Section C.8. As calculated above, the enacted map, with 1-person popluation deviation, scores 4.69 on the seats expected metric. The whole-VTD level blueprint, which has 1.8% population deviation, scores 4.70 by the same metric, as seen in the plot in C.8. This difference of 0.01 is much smaller than the sizes of differences in the seats-expected metric that are driving the results in my report.

5.1 A note on comparing results

Four my cluster-by-cluster analysis of the House and Senate districtings, we will see that even among clusters for which we find that the enacted plan is an extreme outlier, there is quite a bit of variation from cluster to cluster for how extreme an outlier we find the enacted plan to be.

For example, in our second-level analysis of the Guilford county house districting, we find that it is among the most optimized-for-partisanship 00.000089% of all alternative districtings of the county satisfying our districting criteria, while for the Mecklenburg county districting, we find that it is among the most optimized-for-partisanship 5% of districtings.

Because it is tempting to compare results from cluster to cluster, it is important to emphasize that the mathematical results we employ in these findings are one-directional. In particular, while they imply that the Mecklenburg cluster is among the most optimized-for-partisanship 5% of districtings, they do *not* imply that it could not also be among the most optimized-for-partisanship 00.000089%.

What we know from my analysis is that we have extreme statistical certainty that the Guilford cluster districting is among the most optimized-for-partisanship 00.004% of all districtings satisfying the criteria I consider, and we have extreme statistical certainty that the Mecklenburg cluster is among the most optimized-for-partisanship 5% of all districtings satisfying the criteria. The Mecklenburg cluster may be even more of an outlier, but my analysis does not address this latter question in either direction.

It should also be noted that it is natural to expect that my very conservative application of the districting criteria (discussed in Section 4.3.2) will affect some clusters more than others. In some clusters (e.g., Duplin/Wayne), it even prevents any comparison districtings from being generated by my algorithm at all. Of course, this should not seen as settling in either direction the question of whether the enacted map of the Duplin/Wayne cluster is gerrymandered.

6 Results of Analysis

The following pages show the results of my analysis for the enacted Congressional, state House, and state Senate districting plans.

Each page has the following components:

Comparison map examples

I show four maps in each case. The first map is the enacted map. The other three are examples of comparison maps used by by method. In each case, these maps are either the final map from runs 1, 2 and 3, or, from just the first run, the last map, the map from the halfway point of the run, and the run from the 25% point of the run.

Results

Under results I show a **table**, with an entry for each run conducted for the districting. The table shows the fraction of maps in that run that exhibited less partisan bias in favor of Republicans than the enacted map under evaluation. In particular, this is the fraction of maps for which the "seats expected" metric was higher than for the enacted map. For example, on the next page, we will see that in the first run, 99.9999947% of comparisons exhibited less partisan bias in favor of Republicans than the enacted plan.

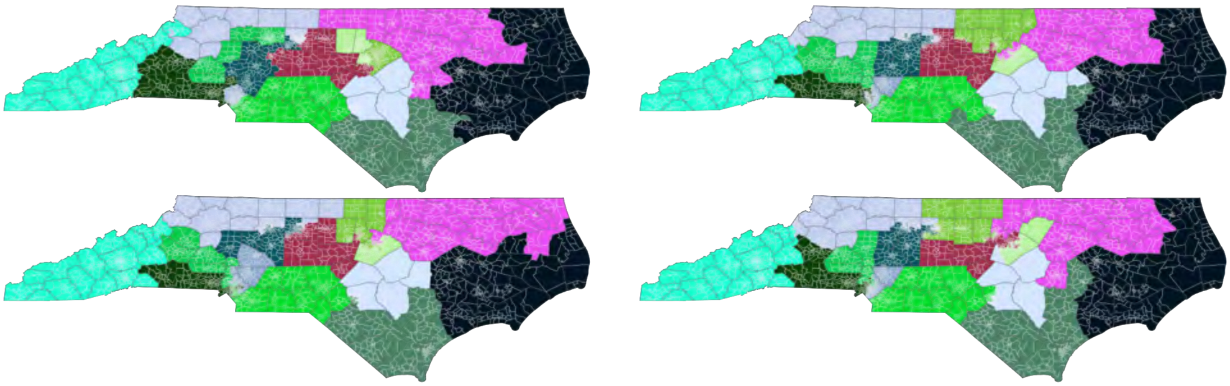
Below this table I show a **histogram** which plots the number of comparison maps whose "seats expected" value fell in various ranges. For example, on the next page, we see that 10.6% of comparison maps had a seats-expected value between 5.8 and 5.9. The histogram also shows the seats-expected value for the enacted map, which for the Congressional districting is 4.69. Note that the computation of this value 4.69 was illustrated earlier in Section 5.0.1. The same computation can be applied to every comparison map to build the histogram of resulting seats-expected values.

I present in each case a **First-level analysis**, which is simply a summary of the how the enacted map compares to the set of comparison districtings generated by my algorithm. For example, for the Congressional map, we will see that in every one of the 32 runs I conducted, 99.999968% of maps produced exhibited less partisan bias than the enacted map itself.

After this I present the **Second-level analysis**, which is a rigorous evaluation of how the enacted map compares to *all* alternative districtings of North Carolina satisfying the districting criteria I consider here. For example, for the Congressional districting as evaluated on the next page, we see that it is more optimized-for-partisanship than 99.999905% of *all* alternative districtings of North Carolina satisfying the criteria I impose as outlined in Section 4.3.1.

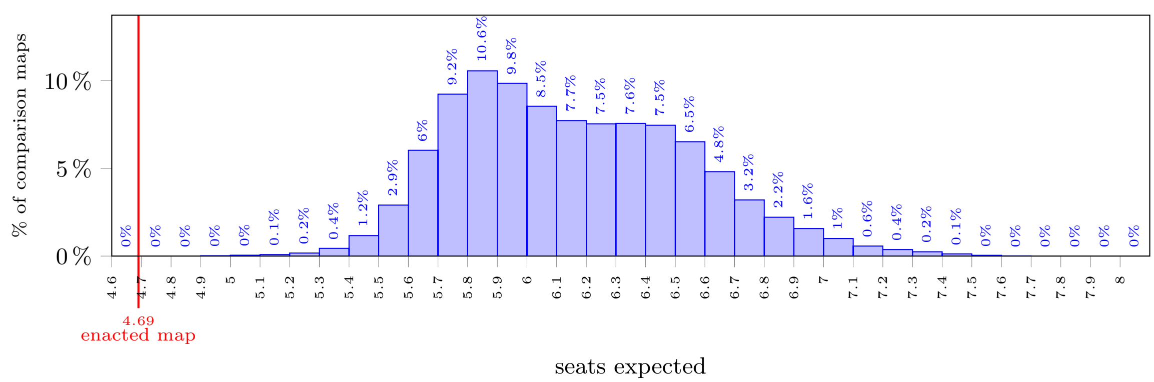
6.1 Congressional districting

6.1.1 Comparison map examples



6.1.2 Results

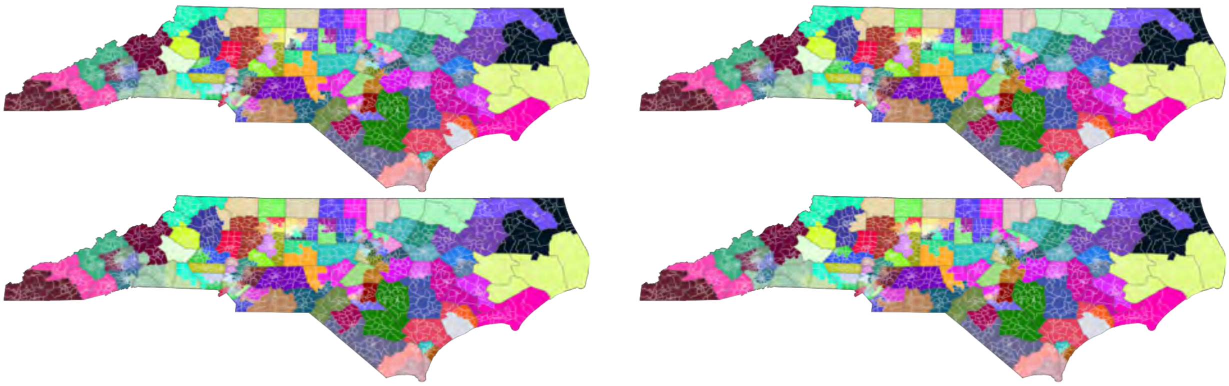
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999947%	9	99.9999909%	17	99.9999955%	25	99.999995%
2	99.999968%	10	99.99999966%	18	99.9999973%	26	99.9999961%
3	99.9999988%	11	99.9999943%	19	99.99999972%	27	99.99999977%
4	99.99999931%	12	99.999988%	20	99.9999999981%	28	99.99999979%
5	99.99999999927%	13	99.999988%	21	99.9999999962%	29	99.9999981%
6	99.9999959%	14	99.9999987%	22	99.99999919%	30	99.9999941%
7	99.99999984%	15	99.999996%	23	99.9999908%	31	99.99999901%
8	99.9999999947%	16	99.999985%	24	99.999981%	32	99.9999969%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.000031% of districtings (in other words, 99.999968% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted House districting is among the most optimized-for-partisanship 0.000094% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.999905% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.000031\%$.

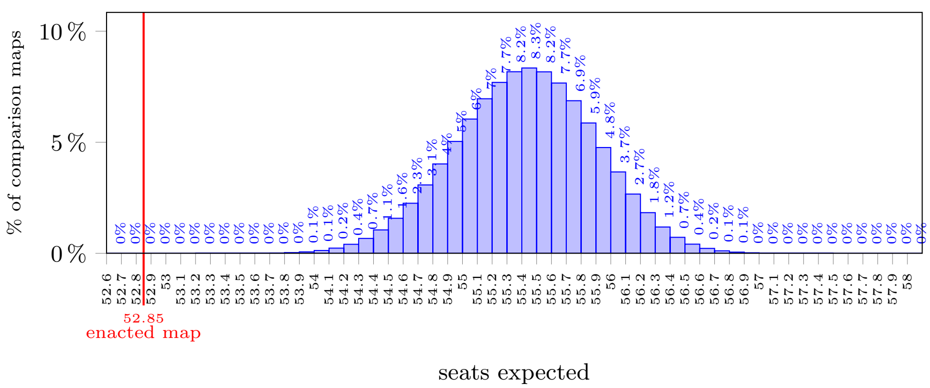
6.2 House districting

6.2.1 Comparison map examples



6.2.2 Results

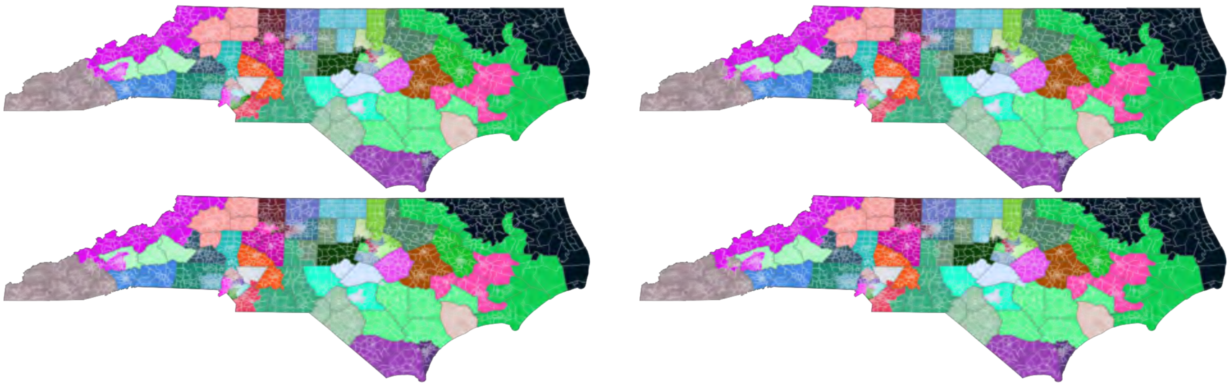
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999999985%	9	99.99999957%	17	99.9999989%	25	99.9999989%
2	99.99999942%	10	99.99999904%	18	99.99999966%	26	99.9999918%
3	99.99999997%	11	99.9999984%	19	99.99999982%	27	99.99999984%
4	99.9999969%	12	99.9999986%	20	99.9999986%	28	99.9999988%
5	99.9999975%	13	99.99999989%	21	99.9999935%	29	99.99999987%
6	99.9999999959%	14	99.99999996%	22	99.9999999967%	30	99.99999908%
7	99.999999985%	15	99.9999984%	23	99.9999975%	31	99.9999966%
8	99.999999951%	16	99.99999954%	24	99.999999939%	32	99.999999939%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.0000081% of districtings (in other words, 99.9999918% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.000024% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.999975% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.0000081\%$.

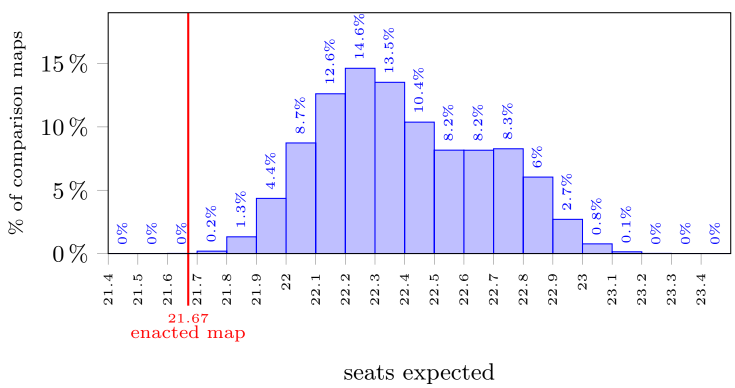
6.3 Senate districting

6.3.1 Comparison map examples



6.3.2 Results

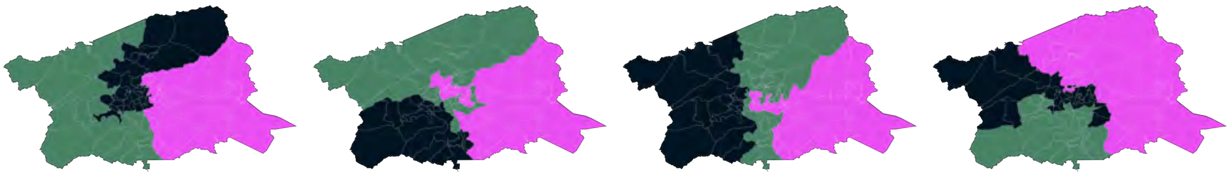
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.988%	9	99.9974%	17	99.9977%	25	99.998%
2	99.9988%	10	99.9958%	18	99.9987%	26	99.9948%
3	99.9938%	11	99.9985%	19	99.9988%	27	99.987%
4	99.9981%	12	99.9957%	20	99.978%	28	99.9988%
5	99.9929%	13	99.988%	21	99.9982%	29	99.9979%
6	99.9916%	14	99.989%	22	99.9978%	30	99.9981%
7	99.9957%	15	99.9974%	23	99.9976%	31	99.99914%
8	99.9973%	16	99.997%	24	99.9975%	32	99.9978%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.021% of districtings (in other words, 99.978% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.065% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.934% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.021\%$.

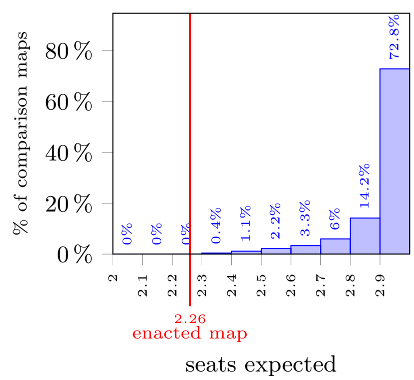
6.4 House Cluster: Buncombe

6.4.1 Comparison map examples



6.4.2 Results

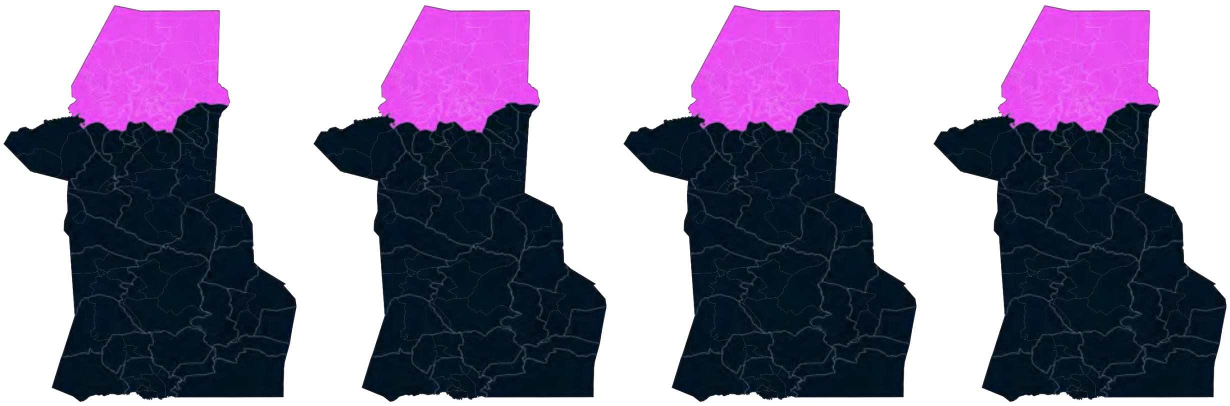
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.979%	9	99.979%	17	99.979%	25	99.98%
2	99.98%	10	99.98%	18	99.979%	26	99.979%
3	99.98%	11	99.98%	19	99.98%	27	99.979%
4	99.98%	12	99.98%	20	99.98%	28	99.98%
5	99.98%	13	99.98%	21	99.98%	29	99.98%
6	99.979%	14	99.98%	22	99.98%	30	99.98%
7	99.98%	15	99.98%	23	99.98%	31	99.979%
8	99.979%	16	99.98%	24	99.98%	32	99.979%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.020% of districtings (in other words, 99.979% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.061% of all alternative districtings satisfying my districting criteria (in other words, 99.938% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.020\%$.

6.5 House Cluster:Duplin/Wayne

6.5.1 Comparison map examples

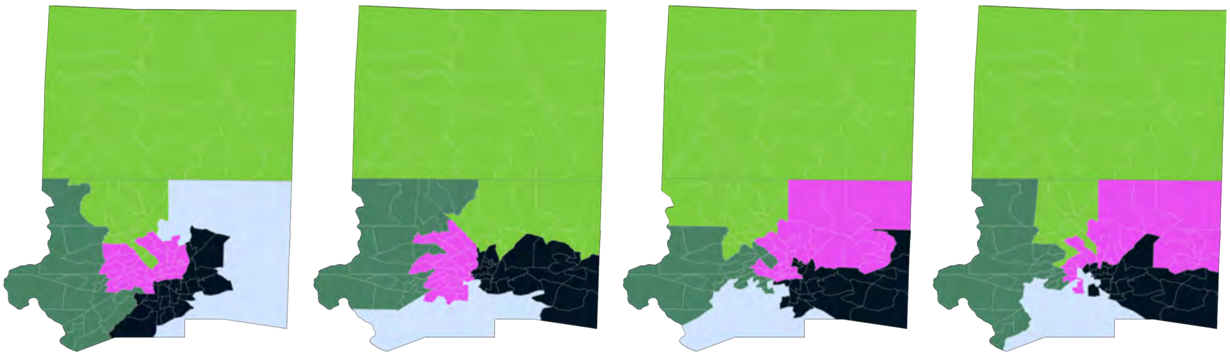


6.5.2 Results

- For this cluster, my conservative approach (as discussed in Section 4.3.2) does not allow my algorithm to generate any comparison maps other than the map itself.

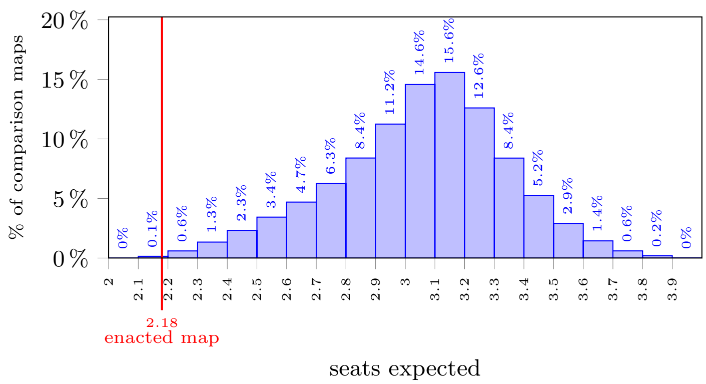
6.6 House Cluster: Forsyth-Stokes

6.6.1 Comparison map examples



6.6.2 Results

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.913%	9	99.912%	17	99.915%	25	99.914%
2	99.914%	10	99.914%	18	99.914%	26	99.913%
3	99.917%	11	99.912%	19	99.916%	27	99.914%
4	99.916%	12	99.912%	20	99.914%	28	99.912%
5	99.913%	13	99.914%	21	99.913%	29	99.915%
6	99.913%	14	99.914%	22	99.914%	30	99.914%
7	99.913%	15	99.912%	23	99.914%	31	99.917%
8	99.913%	16	99.916%	24	99.915%	32	99.915%

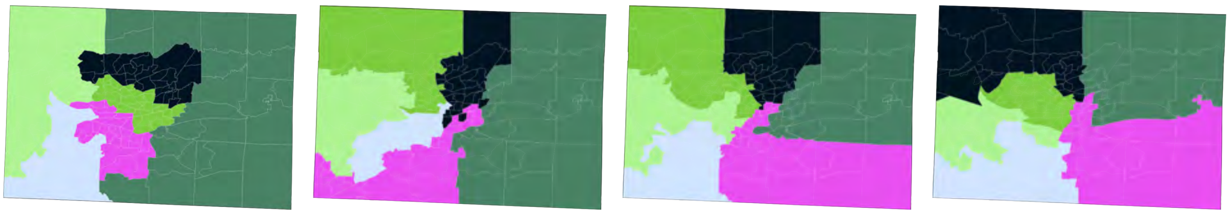


- **First level analysis:** In *every* run, the districting was in the most partisan 0.087% of districtings (in other words, 99.912% were less partisan, in *every* run).

- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.26% of all alternative districtings satisfying my districting criteria (in other words, 99.73% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.087\%$.

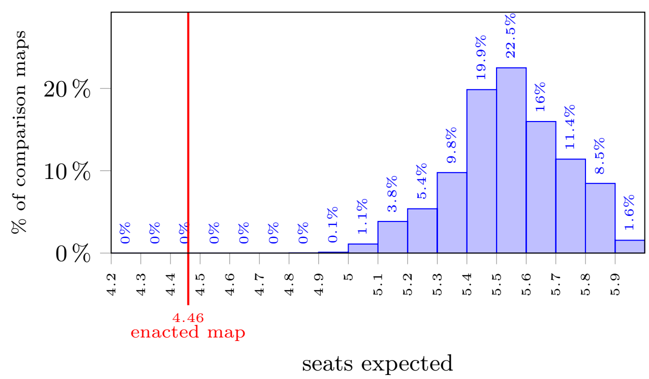
6.7 House Cluster: Guilford

6.7.1 Comparison map examples



6.7.2 Results

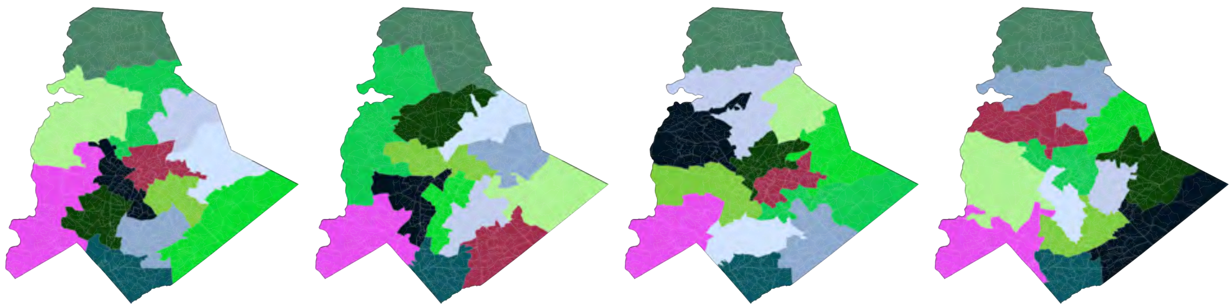
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999989%	9	99.999982%	17	99.999979%	25	99.999972%
2	99.999982%	10	99.999979%	18	99.999978%	26	99.999979%
3	99.999972%	11	99.999978%	19	99.999981%	27	99.999978%
4	99.999986%	12	99.999981%	20	99.999984%	28	99.999979%
5	99.999975%	13	99.999986%	21	99.999983%	29	99.999982%
6	99.999982%	14	99.99998%	22	99.999979%	30	99.999982%
7	99.999981%	15	99.99997%	23	99.999983%	31	99.999982%
8	99.999982%	16	99.999976%	24	99.999981%	32	99.999984%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.000029% of districtings (in other words, 99.99997% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.000089% of all alternative districtings satisfying my districting criteria (in other words, 99.99991% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.000029\%$.

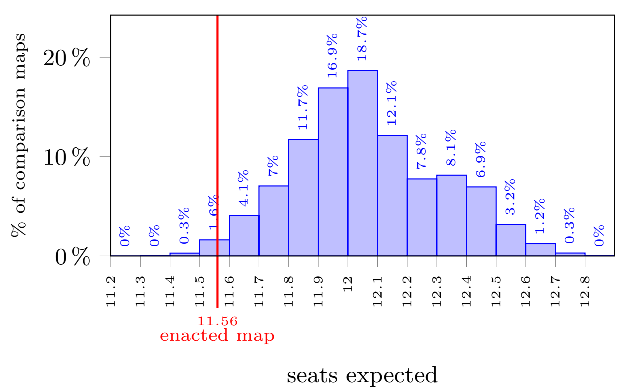
6.8 House Cluster: Mecklenburg

6.8.1 Comparison map examples



6.8.2 Results

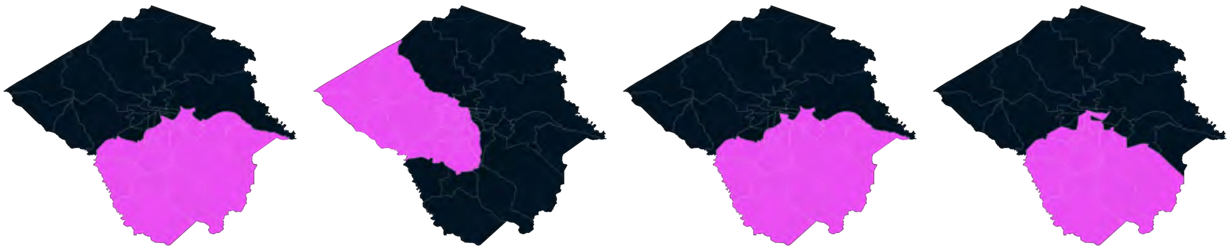
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	98.7%	9	98.6%	17	98.4%	25	98.9%
2	99.36%	10	99.15%	18	99.%	26	98.3%
3	98.7%	11	98.7%	19	98.4%	27	98.8%
4	99.14%	12	99.17%	20	99.17%	28	98.5%
5	98.4%	13	99.05%	21	98.8%	29	99.08%
6	99.33%	14	99.02%	22	98.9%	30	98.9%
7	98.5%	15	99.%	23	98.9%	31	99.12%
8	98.9%	16	99.17%	24	98.9%	32	99.2%



- **First level analysis:** In *every* run, the districting was in the most partisan 1.7% of districtings (in other words, 98.3% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 5.0% of all alternative districtings satisfying my districting criteria (in other words, 95.0% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 1.7\%$.

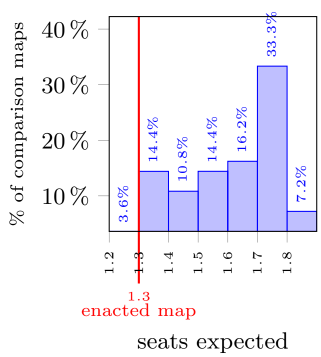
6.9 House Cluster: Pitt

6.9.1 Comparison map examples



6.9.2 Results

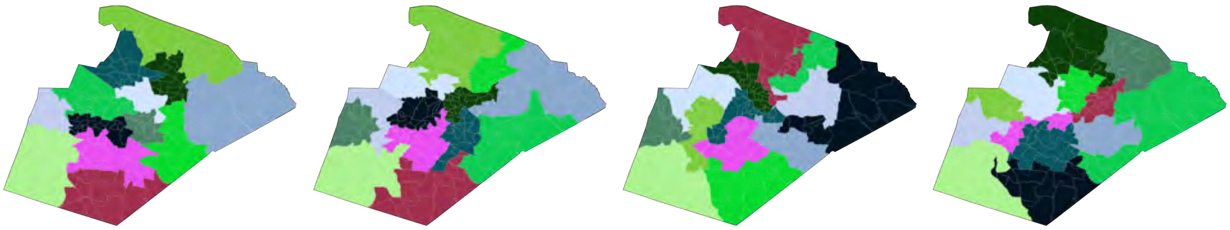
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	96.3%	9	96.4%	17	96.3%	25	96.4%
2	96.3%	10	96.3%	18	96.3%	26	96.3%
3	96.4%	11	96.4%	19	96.3%	27	96.4%
4	96.4%	12	96.4%	20	96.3%	28	96.3%
5	96.4%	13	96.4%	21	96.3%	29	96.4%
6	96.3%	14	96.3%	22	96.4%	30	96.3%
7	96.3%	15	96.3%	23	96.4%	31	96.4%
8	96.3%	16	96.4%	24	96.4%	32	96.4%



- **First level analysis:** In *every* run, the districting was in the most partisan 3.6% of districtings (in other words, 96.3% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 11% of all alternative districtings satisfying my districting criteria (in other words, 89.1% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 3.6\%$.

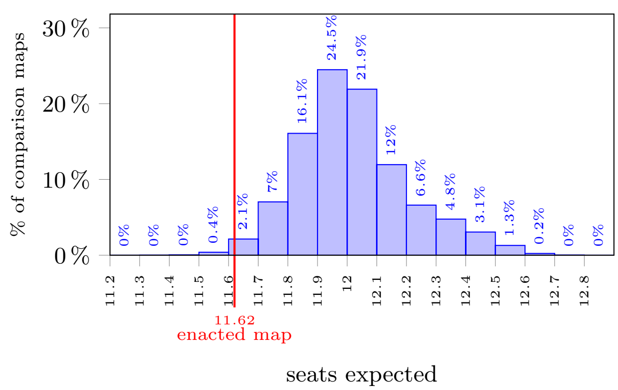
6.10 House Cluster: Wake

6.10.1 Comparison map examples



6.10.2 Results

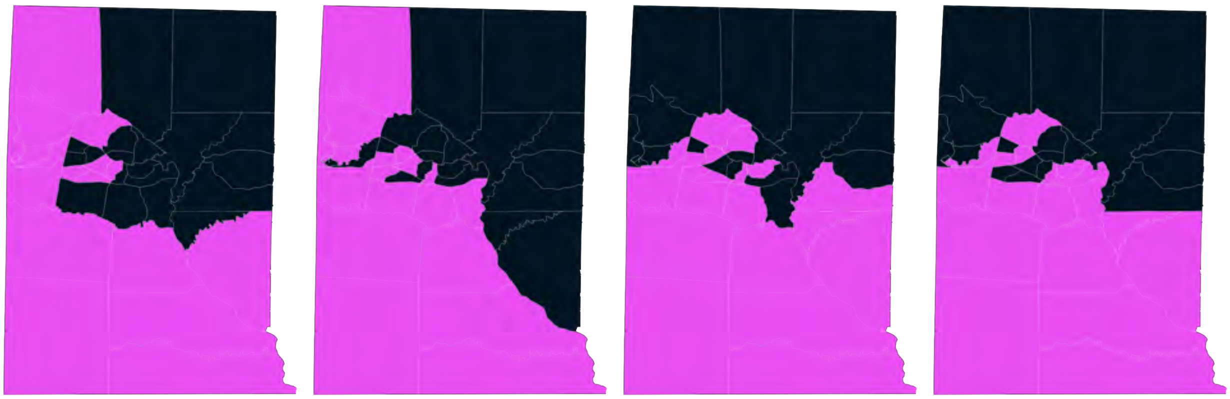
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.38%	9	99.34%	17	99.37%	25	99.35%
2	99.33%	10	99.35%	18	99.36%	26	99.36%
3	99.34%	11	99.33%	19	99.33%	27	99.34%
4	99.32%	12	99.34%	20	99.35%	28	99.33%
5	99.35%	13	99.34%	21	99.33%	29	99.35%
6	99.33%	14	99.27%	22	99.31%	30	99.36%
7	99.34%	15	99.34%	23	99.32%	31	99.36%
8	99.34%	16	99.36%	24	99.35%	32	99.35%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.72% of districtings (in other words, 99.27% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 2.2% of all alternative districtings satisfying my districting criteria (in other words, 97.8% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.72\%$.

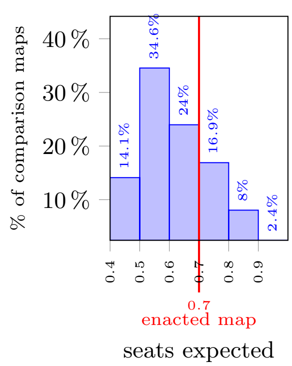
6.11 House Cluster: Alamance

6.11.1 Comparison map examples



6.11.2 Results

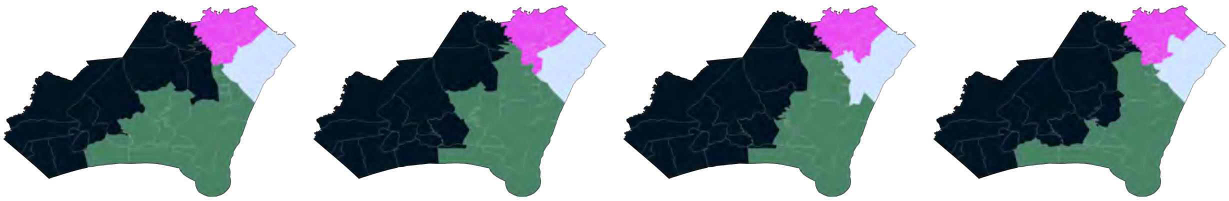
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	26.3%	9	26.4%	17	26.3%	25	26.4%
2	26.3%	10	26.3%	18	26.4%	26	26.3%
3	26.3%	11	26.3%	19	26.3%	27	26.3%
4	26.4%	12	26.3%	20	26.3%	28	26.3%
5	26.4%	13	26.4%	21	26.4%	29	26.3%
6	26.3%	14	26.3%	22	26.4%	30	26.4%
7	26.4%	15	26.3%	23	26.3%	31	26.3%
8	26.4%	16	26.4%	24	26.4%	32	26.4%



- **First level analysis:** In *every* run, the districting was in the most partisan 74% of districtings (in other words, 26.3% were less partisan, in *every* run).
- **Second level analysis:** The enacted map is not unusual enough in the first-level analysis to enable a statistically significant second-level analysis of this cluster.

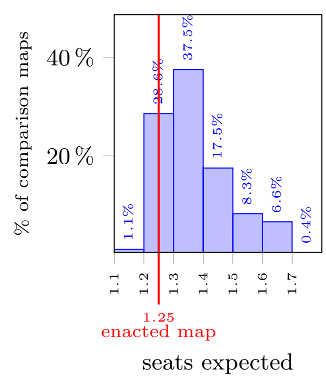
6.12 House Cluster: Brunswick/New Hanover

6.12.1 Comparison map examples



6.12.2 Results

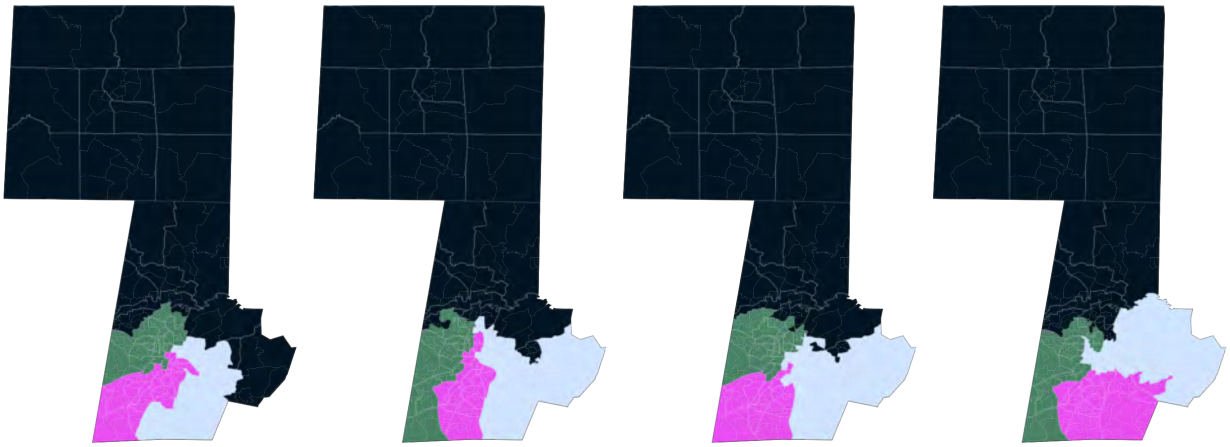
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	89.4%	9	89.5%	17	89.5%	25	89.5%
2	89.4%	10	89.5%	18	89.4%	26	89.5%
3	89.5%	11	89.5%	19	89.5%	27	89.4%
4	89.4%	12	89.4%	20	89.4%	28	89.5%
5	89.4%	13	89.5%	21	89.5%	29	89.5%
6	89.5%	14	89.6%	22	89.5%	30	89.4%
7	89.4%	15	89.5%	23	89.5%	31	89.5%
8	89.5%	16	89.4%	24	89.4%	32	89.5%



- **First level analysis:** In *every* run, the districting was in the most partisan 11% of districtings (in other words, 89.4% were less partisan, in *every* run).
- **Second level analysis:** The enacted map is not unusual enough in the first-level analysis to enable a statistically significant second-level analysis of this cluster.

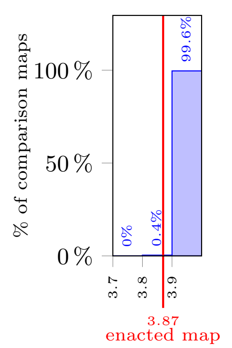
6.13 House Cluster: Durham/Person

6.13.1 Comparison map examples



6.13.2 Results

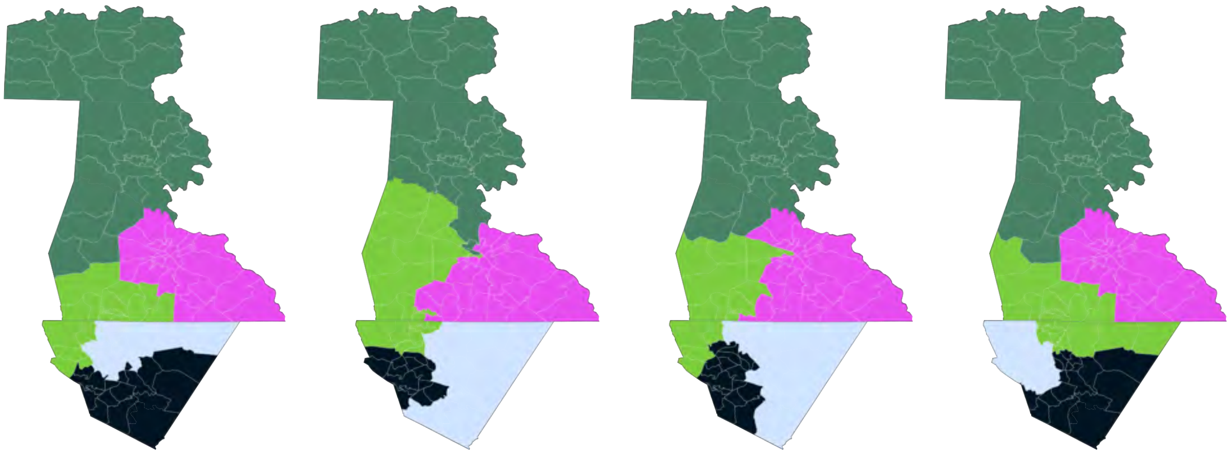
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.936%	9	99.935%	17	99.938%	25	99.935%
2	99.933%	10	99.937%	18	99.937%	26	99.933%
3	99.937%	11	99.94%	19	99.934%	27	99.939%
4	99.932%	12	99.933%	20	99.934%	28	99.936%
5	99.933%	13	99.936%	21	99.936%	29	99.937%
6	99.936%	14	99.935%	22	99.938%	30	99.933%
7	99.937%	15	99.933%	23	99.937%	31	99.94%
8	99.936%	16	99.936%	24	99.934%	32	99.934%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.067% of districtings (in other words, 99.932% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.20% of all alternative districtings satisfying my districting criteria (in other words, 99.79% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.067\%$.

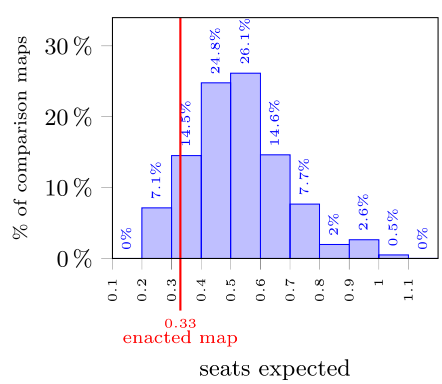
6.14 House Cluster: Cabarrus/Davie/Rowan/Yadkin

6.14.1 Comparison map examples



6.14.2 Results

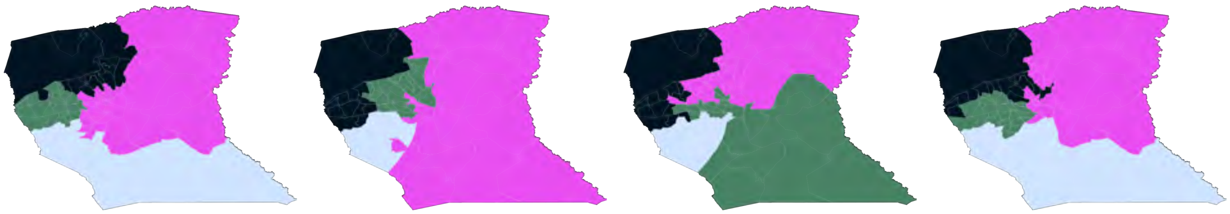
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	89.0%	9	90.0%	17	88.5%	25	89.9%
2	90.0%	10	88.9%	18	89.0%	26	88.6%
3	90.1%	11	88.7%	19	89.4%	27	89.9%
4	88.4%	12	89.8%	20	89.3%	28	88.9%
5	89.7%	13	89.4%	21	92.8%	29	89.5%
6	88.6%	14	89.2%	22	89.1%	30	87.7%
7	89.5%	15	88.8%	23	89.1%	31	90.2%
8	90.0%	16	90.0%	24	88.7%	32	90.4%



- **First level analysis:** In *every* run, the districting was in the most partisan 12% of districtings (in other words, 87.7% were less partisan, in *every* run).
- **Second level analysis:** The enacted map is not unusual enough in the first-level analysis to enable a statistically significant second-level analysis of this cluster.

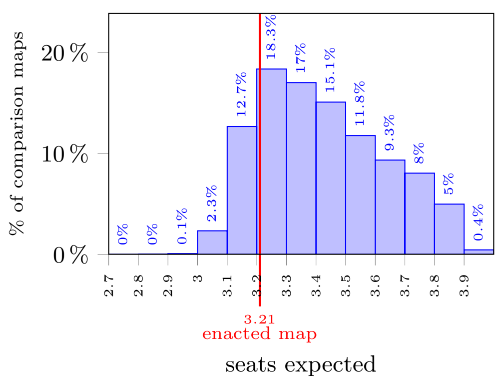
6.15 House Cluster: Cumberland

6.15.1 Comparison map examples



6.15.2 Results

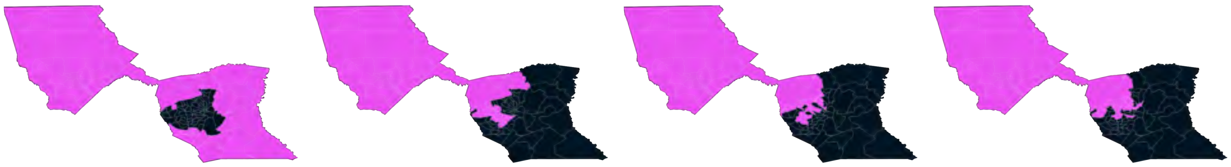
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	83.6%	9	83.8%	17	83.8%	25	84.0%
2	83.7%	10	83.9%	18	83.6%	26	83.5%
3	83.8%	11	83.8%	19	83.7%	27	83.8%
4	83.7%	12	83.6%	20	83.7%	28	83.8%
5	83.6%	13	83.7%	21	84.0%	29	83.7%
6	83.7%	14	83.6%	22	83.9%	30	83.6%
7	83.5%	15	83.8%	23	83.7%	31	83.9%
8	83.7%	16	83.8%	24	83.6%	32	83.9%



- **First level analysis:** In *every* run, the districting was in the most partisan 16% of districtings (in other words, 83.5% were less partisan, in *every* run).
- **Second level analysis:** The enacted map is not unusual enough in the first-level analysis to enable a statistically significant second-level analysis of this cluster.

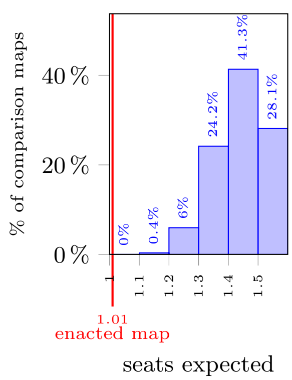
6.16 Senate Cluster: Cumberland Moore

6.16.1 Comparison map examples



6.16.2 Results

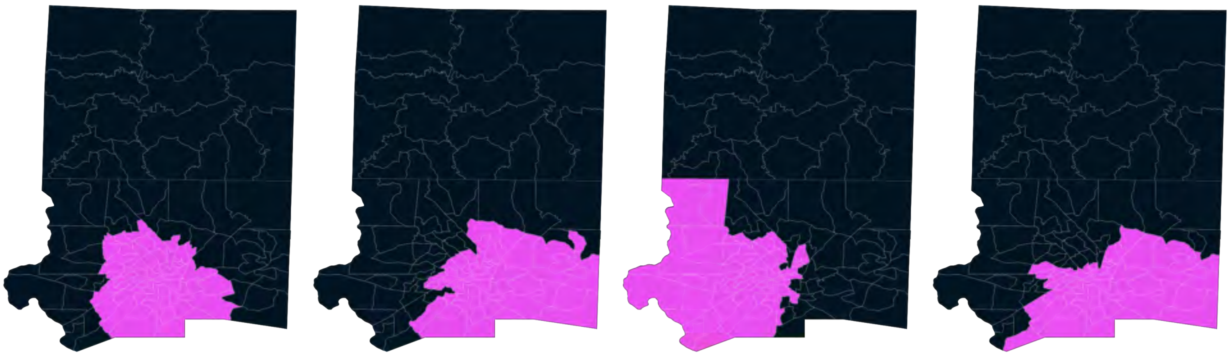
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999968%	9	99.9999962%	17	99.9999963%	25	99.9999954%
2	99.9999961%	10	99.9999965%	18	99.9999969%	26	99.9999955%
3	99.999998%	11	99.9999954%	19	99.9999967%	27	99.999997%
4	99.9999953%	12	99.9999961%	20	99.9999969%	28	99.9999952%
5	99.9999969%	13	99.9999957%	21	99.9999971%	29	99.9999959%
6	99.9999969%	14	99.9999949%	22	99.9999961%	30	99.9999956%
7	99.9999966%	15	99.9999964%	23	99.9999961%	31	99.9999961%
8	99.9999966%	16	99.9999959%	24	99.9999977%	32	99.9999965%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.0000050% of districtings (in other words, 99.9999949% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.000015% of all alternative districtings satisfying my districting criteria (in other words, 99.999984% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.0000050\%$.

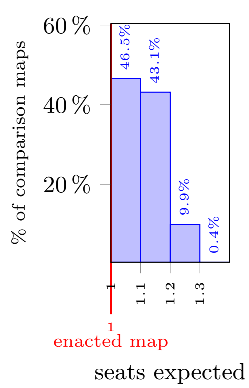
6.17 Senate Cluster: Forsyth-Stokes

6.17.1 Comparison map examples



6.17.2 Results

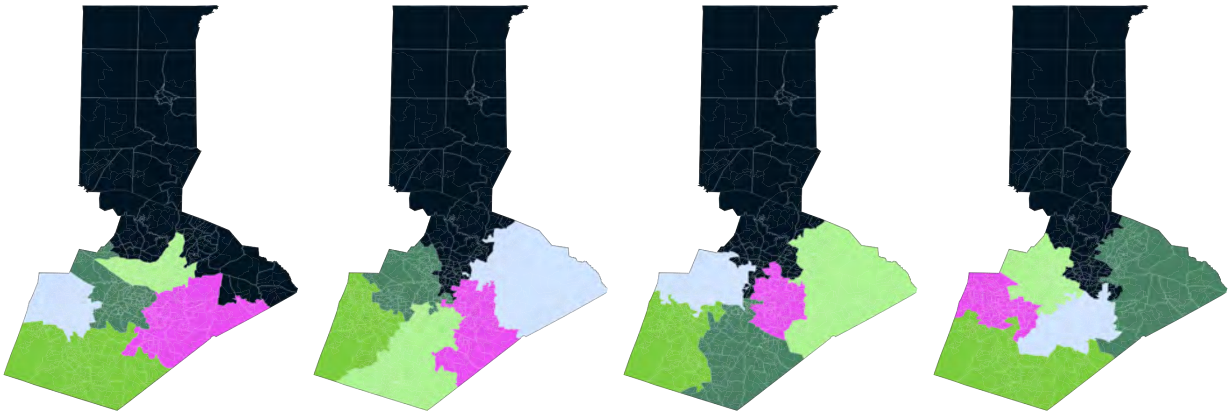
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9983%	9	99.9983%	17	99.9983%	25	99.9983%
2	99.9984%	10	99.9984%	18	99.9984%	26	99.9983%
3	99.9982%	11	99.9983%	19	99.9984%	27	99.9983%
4	99.9982%	12	99.9984%	20	99.9983%	28	99.9984%
5	99.9983%	13	99.9983%	21	99.9983%	29	99.9983%
6	99.9984%	14	99.9983%	22	99.9983%	30	99.9984%
7	99.9984%	15	99.9983%	23	99.9983%	31	99.9984%
8	99.9984%	16	99.9984%	24	99.9984%	32	99.9983%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.0016% of districtings (in other words, 99.9983% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.0051% of all alternative districtings satisfying my districting criteria (in other words, 99.9947% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.0016\%$.

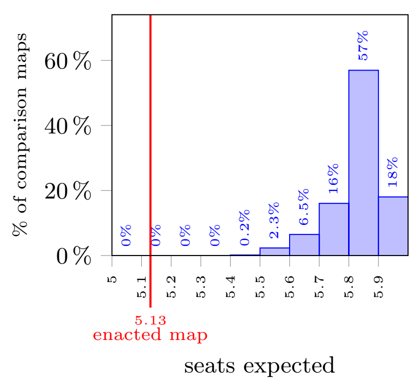
6.18 Senate Cluster: Granville-Wake

6.18.1 Comparison map examples



6.18.2 Results

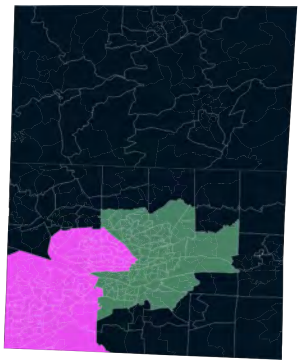
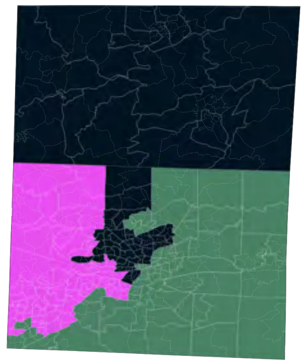
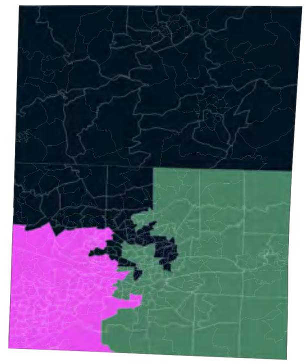
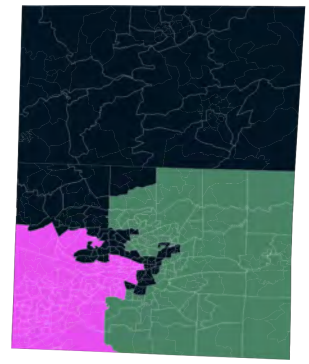
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99999934%	9	99.99999921%	17	99.99999999936%	25	99.9999971%
2	99.9999984%	10	99.99999999936%	18	99.99999913%	26	99.9999975%
3	99.99999917%	11	99.99999966%	19	99.9999967%	27	99.99999909%
4	99.99999999945%	12	99.9999979%	20	99.99999963%	28	99.999989%
5	99.99999974%	13	99.9999989%	21	99.9999999984%	29	99.99999999954%
6	99.999999939%	14	99.9999976%	22	99.99999948%	30	99.9999968%
7	99.9999999982%	15	99.9999947%	23	99.9999984%	31	99.99999999945%
8	99.9999995%	16	99.99999969%	24	99.99999967%	32	99.99999971%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.000010% of districtings (in other words, 99.999989% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.000030% of all alternative districtings satisfying my districting criteria (in other words, 99.999969% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.000010\%$.

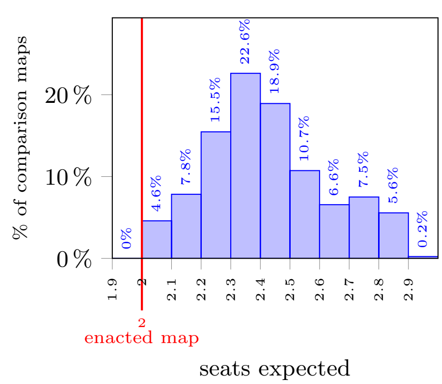
6.19 Senate Cluster: Guilford-Rockingham

6.19.1 Comparison map examples

6.19.2 Results

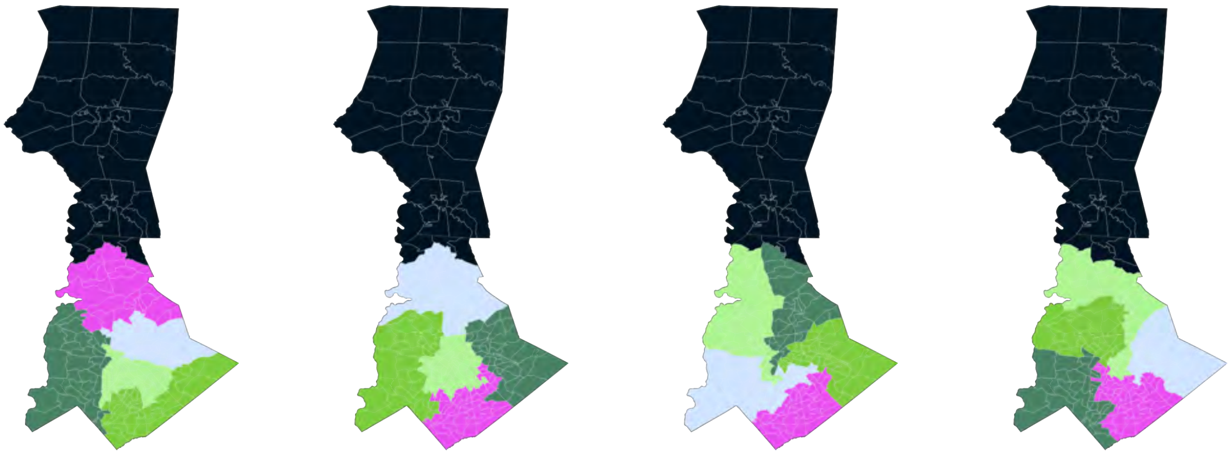
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999979%	9	99.9999971%	17	99.999989%	25	99.999984%
2	99.999975%	10	99.999999976%	18	99.9999929%	26	99.99999949%
3	99.9999991%	11	99.9999944%	19	99.999988%	27	99.999967%
4	99.999984%	12	99.99998%	20	99.99998%	28	99.999995%
5	99.999976%	13	99.9999978%	21	99.99996%	29	99.999957%
6	99.9999922%	14	99.999978%	22	99.999979%	30	99.9999999957%
7	99.9999997%	15	99.999986%	23	99.9999964%	31	99.9999935%
8	99.999967%	16	99.9999939%	24	99.999983%	32	99.9999984%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.000042% of districtings (in other words, 99.999957% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.00012% of all alternative districtings satisfying my districting criteria (in other words, 99.99987% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.000042\%$.

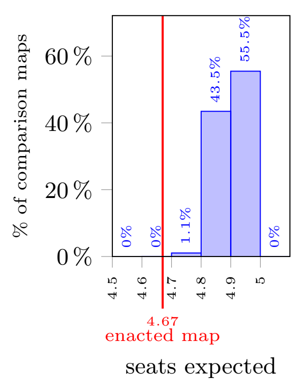
6.20 Senate Cluster: Iredell-Mecklenburg

6.20.1 Comparison map examples



6.20.2 Results

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9981%	9	99.9983%	17	99.9982%	25	99.9982%
2	99.9982%	10	99.9983%	18	99.9982%	26	99.9983%
3	99.9982%	11	99.9981%	19	99.9981%	27	99.9981%
4	99.9982%	12	99.9982%	20	99.9982%	28	99.9982%
5	99.9981%	13	99.9982%	21	99.9982%	29	99.9982%
6	99.9983%	14	99.9982%	22	99.9982%	30	99.9982%
7	99.9982%	15	99.9982%	23	99.9982%	31	99.9982%
8	99.9982%	16	99.9982%	24	99.9982%	32	99.9981%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.0019% of districtings (in other words, 99.998% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.0057% of all alternative districtings satisfying my districting criteria (in other words, 99.9943% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.0019\%$.

7 Seat preservation analyses

In this section I present analyses of clusters for which my main analysis does not achieve high confidence of gerrymandering with respect to the seats-expected metric. These are the districtings in the following House clusters:

- Alamance
- Brunswick/New Hanover
- Cabarrus/Davie/Rowan/Yadkin
- Cumberland

Note that the motivation for the seat-expected metric is to detect partisan gerrymandering aimed at maximizing the expected total number of seats belonging to one party in a representative body (Congress, the North Carolina house, or the North Carolina senate). But there may be other conceivable partisan goals, such as facilitating the re-election of particular representatives in particular districts, which may be orthogonal to or (at least not perfectly correlated with) the goal of maximizing expected representation from one party, and thus which would not be detected by the seats-expected metric.

The metric I use in this section to re-analyze these districtings is the *wave threshold* for a particular seat count. In particular, for a given number of seats x, the wave threshold for x is the smallest uniform swing which can be applied to election data (here, the 2020 Attorney General race) which would result in $x+1$ Democratic seats. Put differently, this is the threshold such that for any smaller uniform swing, the Democrats will win at most x seats. Referring back to Figure 1, we see that for the enacted Congressional districting of North Carolina, the wave thresholds for $x = 3, 4, 5$, and 6 are −3.56%, 1.68%, 3.05%, and 5.82%, respectively. In particular, even in an election in which voter patterns mirror the 2020 Attorney General race **with all Democratic vote shares increased by an additional** 5.81 **percentage points**, the enacted Congressional districting would still produce only 6 Democrat representatives.

The wave threshold metric can capture partisan goals which may be washed out in the seats-expected metric. For example, if a 5-district cluster is proposed to be districted to optimize the chance that three Republican incumbents all can save their seats, this may or may not result in an increase in the seats-expected metric (for example, if the alternative was to have 4 lean-Republican competitive districts, the extent of the lean would determine how the proposed and alternative districtings would compare under the seats expected metric). But such a plan would be expected to stand out as being highly unusual with respect to the wave threshold for 2 Democratic seats, as it would be an extreme outlier with respect to how difficult it would be for Democrats to capture more than 2 seats in the cluster.

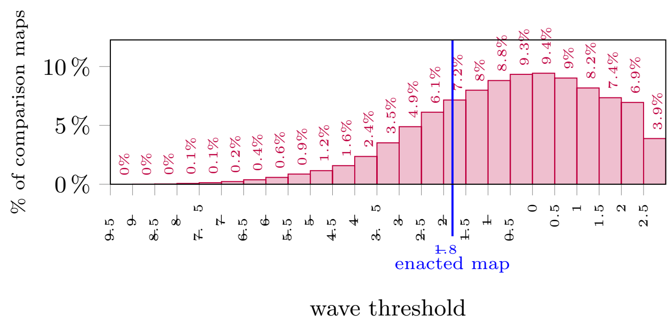
All wave-threshold histograms are shown with red bars, to visually distinguish them from the seats-expected histograms shown elsewhere in the report. Note that unlike for the seats-expected histograms, a Republican bias in the enacted map with respect to a particular wave threshold is indicated by the enacted map showing as an outlier on the righthand side of the plot.

[Report continues on next page for formatting reasons]

7.1 Alamance

The comparison maps generated by my algorithm were similar to the enacted map with respect to their wave threshold for both possible seat values (results here shown for the wave threshold for 0 seats):

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	25.2%	9	25.2%	17	25.1%	25	25.2%
2	25.2%	10	25.0%	18	25.1%	26	25.2%
3	25.2%	11	25.1%	19	25.1%	27	25.2%
4	25.2%	12	25.2%	20	25.1%	28	25.2%
5	25.3%	13	25.2%	21	25.3%	29	25.3%
6	25.2%	14	25.2%	22	25.2%	30	25.2%
7	25.2%	15	25.1%	23	25.3%	31	25.3%
8	25.2%	16	25.2%	24	25.2%	32	25.2%

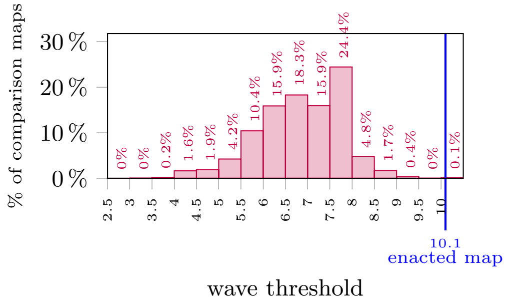


7.2 Brunswick/New Hanover

Despite the fact that my algorithm did not detect large differences between the enacted districting and comparison districtings of this cluster, the enacted map is an extreme outlier among the comparison maps generated by my algorithm with respect to the wave threshold for two seats. In particuliar, for the enacted map in this cluster, Democratic performance could increase by 10.1 percentage points in every district without Democrats capturing more than two seats. In every run of my algorithm, 99.72% of comparison maps would allow Democrats to capture a third seat with a smaller wave.

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.987%	9	99.94%	17	99.9956%	25	99.83%
2	99.99%	10	99.907%	18	99.9957%	26	99.79%
3	99.929%	11	99.85%	19	99.8%	27	99.975%
4	99.88%	12	99.9912%	20	99.922%	28	99.85%
5	99.86%	13	99.77%	21	99.961%	29	99.83%
6	99.934%	14	99.89%	22	99.952%	30	99.92%
7	99.73%	15	99.87%	23	99.97%	31	99.946%
8	99.96%	16	99.72%	24	99.911%	32	99.961%

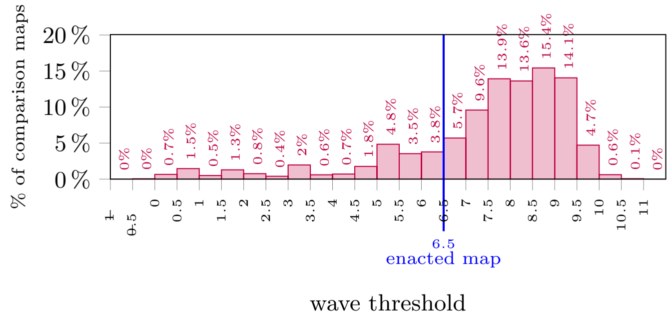
PEGDEN 2


% of comparison maps
30 %
20 %
10 %
0 %
0%
0%
0.2%
1.6%
1.9%
4.2%
10.4%
15.9%
18.3%
15.9%
24.4%
4.8%
1.7%
0.4%
0%
0.1%
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
10
10.1
enacted map
wave threshold

7.3 Cabarrus/Davie/Rowan/Yadkin

The comparison maps generated by my algorithm were similar to the enacted map with respect to their wave threshold for all seat values (results here shown for the wave threshold for 1 seat):

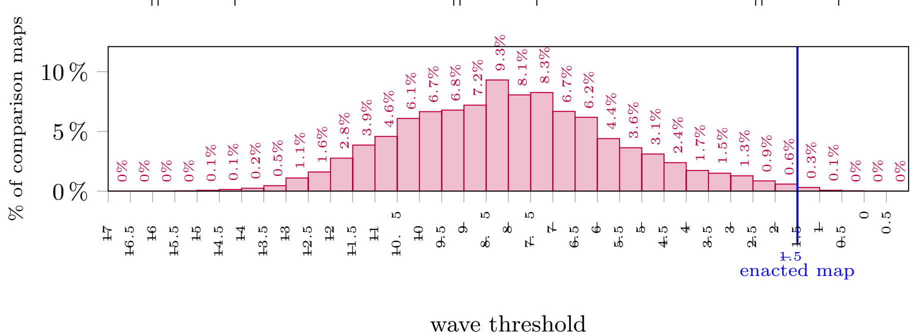
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	26.3%	9	20.7%	17	22.0%	25	22.3%
2	22.6%	10	23.1%	18	21.4%	26	20.8%
3	19.4%	11	27.6%	19	23.3%	27	20.2%
4	20.7%	12	21.2%	20	25.7%	28	22.0%
5	18.8%	13	23.4%	21	21.8%	29	22.1%
6	21.9%	14	25.4%	22	20.8%	30	22.3%
7	24.3%	15	20.0%	23	22.9%	31	22.4%
8	20.4%	16	19.9%	24	23.1%	32	23.8%



7.4 Cumberland

Despite the fact that my algorithm did not detect large differences between the enacted districting and comparison districtings of this cluster, the enacted map is an extreme outlier among the comparison maps generated by my algorithm with respect to the wave threshold for two seats.

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.61%	9	99.62%	17	99.62%	25	99.64%
2	99.64%	10	99.64%	18	99.62%	26	99.63%
3	99.61%	11	99.61%	19	99.61%	27	99.63%
4	99.62%	12	99.62%	20	99.63%	28	99.6%
5	99.59%	13	99.62%	21	99.64%	29	99.63%
6	99.61%	14	99.59%	22	99.63%	30	99.62%
7	99.61%	15	99.62%	23	99.62%	31	99.6%
8	99.61%	16	99.63%	24	99.62%	32	99.62%



Appendix A Multimoves / Precinct splits

As discussed in Section 5 my algorithm can be set to allow multiple changes to a map to occur in one step, when this is necessary to produce a sufficiently rich set of comparison maps.

Here I describe details of this technique so that technical experts can understand how precisely our method works. These details are not necessary to understand the basic mechanics of the method, which are simply that:

- Multiple changes may be made to a map in a single step,
- The result of the changes must always be a valid comparison map, in the sense that it complies with the districting criteria we consider in our report, and
- Our implementation of multiple moves does not bias the algorithm to any map or family of maps.

For technical experts: these multiple moves can be implemented with a Metropolis-Hastings approach. In particular, a score function based on the deviation of an invalid map from the compactness and population thresholds can be defined. *The score function is set to be equal for all maps satisfying the districting criteria.* With this choice, a uniform stationary distribution can be constructed on the space of maps satisfying the districting criteria. The Metropolis-Hastings chain will occasionally leave the feasible region of the map-space for some number of steps before returning to the feasible region. The collection of steps made outside the feasible region can be performed in a single step, to give a single multi-move which transforms one valid map into another valid map.

A related implementation detail concerns precinct splits. When operating at the geounit level but preserving the maximum number of precinct splits, I can allow the chain at intermediate points to have one more split than is allowed, while discarding these intermediate, invalid comparison maps. For example, in a map which currently splits two specific precincts, the chain is allowed to produce a valid comparison map by changing the district membership of another precinct. Note that this does not change the number of precinct splits, but viewed in terms of single geounit moves, it passes through a set of maps with a greater number of precinct splits. As in the case of multimoves discussed above, these intermediate maps are not part of the comparison set, and we can view the precinct swap as a single multimove of geounit swaps.

Finally, I note that when operating below the precinct level in House clusters with split precincts, my algorithm imposes an additional compactness-like constraint on any precinct splits, which is simply that the length of the precinct split is not large relative to the perimeter of the precinct itself. (The enacted plan satisfies this constraint in all cases.)

Appendix B Theorems

The second level analyses in my report are calculated using the theorems from [CFMP]; in particular, Theorem 1.5 from that manuscript suffices for all of my second-level findings here.

In plain language, that theorem says that if I conduct m runs, and observe that in every run the enacted plan is in the bottom ε fraction of comparison maps, then I can conclude that the enacted plan is among the most carefully crafted α fraction of *all* maps satisfying the districting criteria (not just those encountered by the algorithm), measured by their ε-fragility, at a statistical significance calculated with the formula

$$p = \left(\frac{2\varepsilon}{\alpha}\right)^{m/2}.$$

In this report, I frequently have $m = 32$ runs and choose α to simply be 3 times as big as ε. In this case, we see that we can conclude that the enacted plan is among the most carefully crafted 3ε of all maps, at a statistical significance of

$$p = \left(\frac{2}{3}\right)^{16} \approx .0015 < .002.$$

Note that, for example, if we used instead a threshold of $\alpha = 4\varepsilon$, this would give significance of

$$p = \left(\frac{2}{4}\right)^{16} \approx .000015,$$

and taking a threshold of $\alpha = 6\varepsilon$ would give

$$p = \left(\frac{2}{6}\right)^{16} \approx .00000002,$$

[Report continues on next page for formatting reasons]

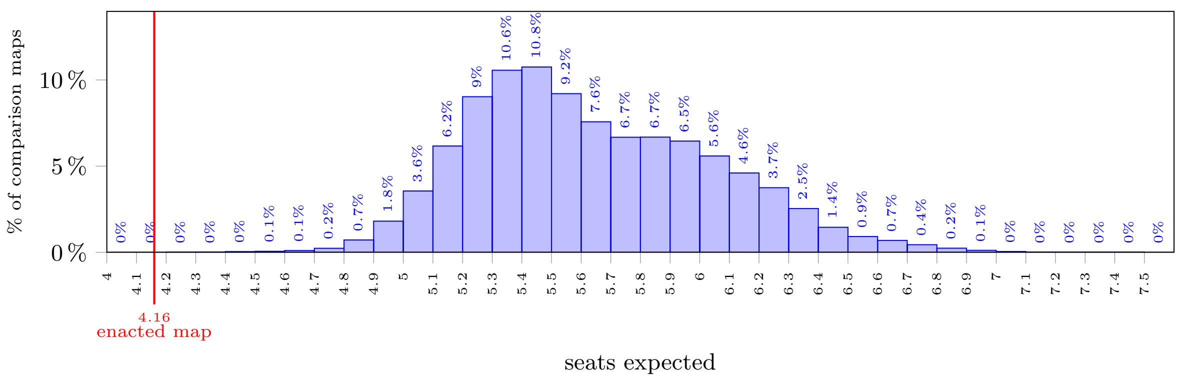
Appendix C Robustness Checks, Congressional districting

C.1 Robustness to election data

Here I show results when my analysis of the Congressional map is repeated with other elections in place of the 2020 Attorney General election as my proxy for partisan voting patterns.

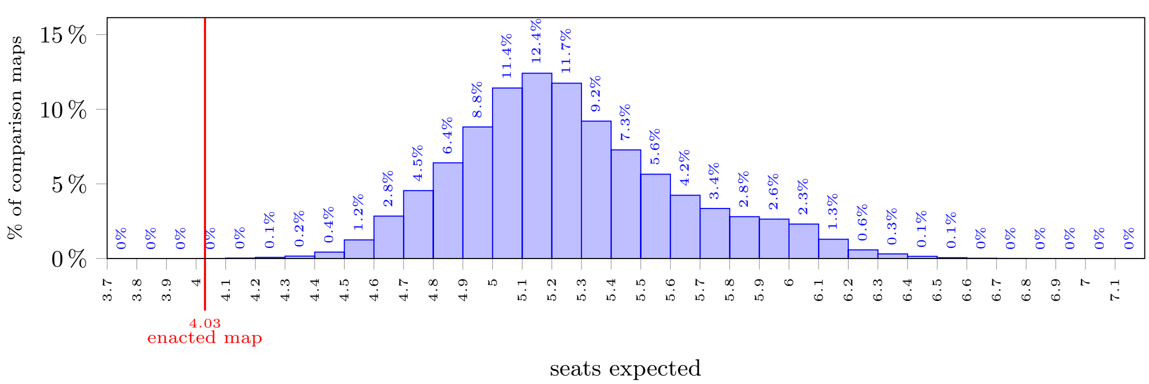
C.1.1 Results with 2020 Presidential election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999925%	5	99.999986%	9	99.9999908%	13	99.9999926%
2	99.999921%	6	99.999999968%	10	99.9999932%	14	99.999988%
3	99.9999955%	7	99.999984%	11	99.9999979%	15	99.9999989%
4	99.9999933%	8	99.99995%	12	99.9999999981%	16	99.999978%



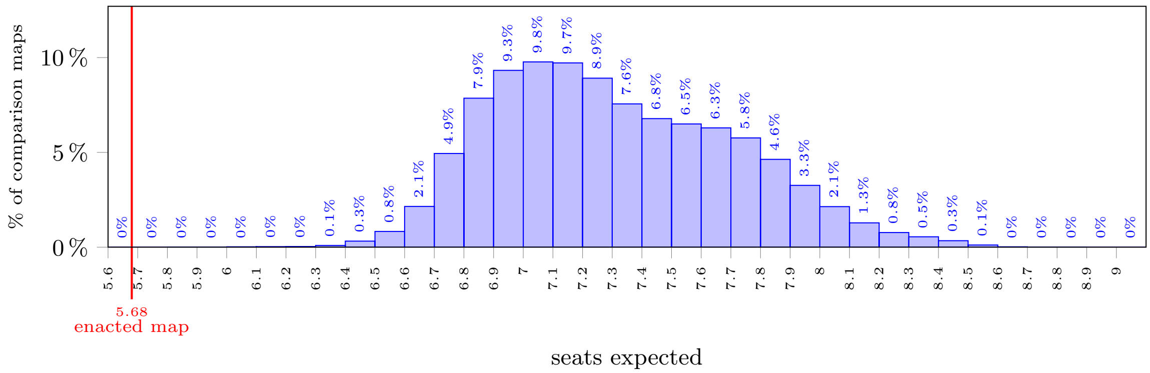
C.1.2 Results with 2020 Lieutenant Governor election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999973%	5	99.999937%	9	99.999942%	13	99.999982%
2	99.99985%	6	99.9999964%	10	99.99901%	14	99.999978%
3	99.999905%	7	99.99954%	11	99.9999928%	15	99.999934%
4	99.999964%	8	99.99975%	12	99.9995%	16	99.9998%



C.1.3 Results with 2020 Governor election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999989%	5	99.9999979%	9	99.9999975%	13	99.99999923%
2	99.9999914%	6	99.9999999922%	10	99.99999974%	14	99.99999968%
3	99.9999996%	7	99.999999934%	11	99.999999994%	15	99.999999982%
4	99.999999966%	8	99.9999982%	12	99.9999999981%	16	99.999999961%

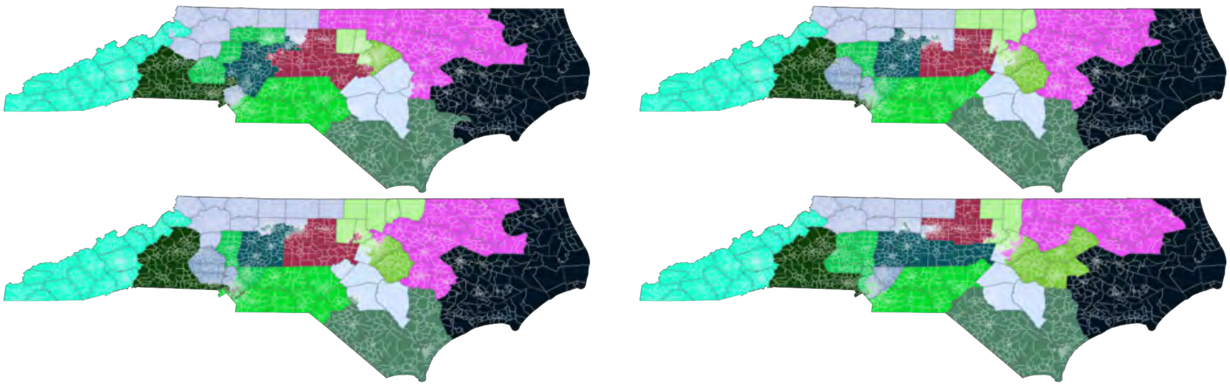


[Report continues on next page for formatting reasons]

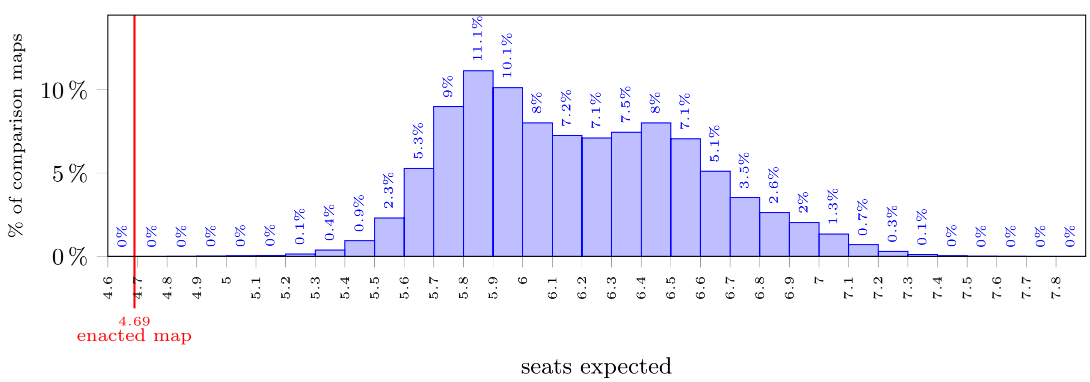
C.2 Robustness to incumbency protection

Here I show results when my analysis of the Congressional map is repeated without ensuring the protection of incumbents.

C.2.1 Comparison map examples



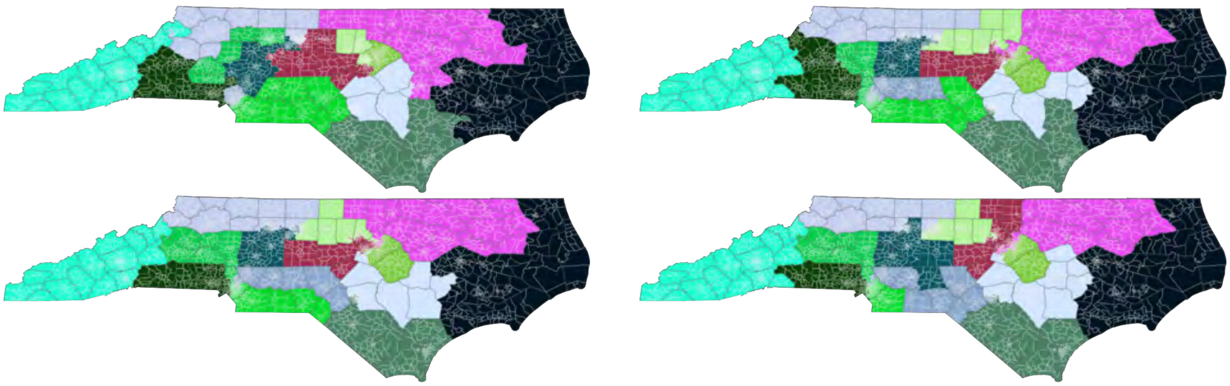
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999998%	5	99.99999918%	9	99.9999976%	13	99.999982%
2	99.999999901%	6	99.9999978%	10	99.999989%	14	99.99999901%
3	99.9999986%	7	99.999999961%	11	99.9999967%	15	99.99999977%
4	99.9999967%	8	99.9999954%	12	99.9999999981%	16	99.9999986%



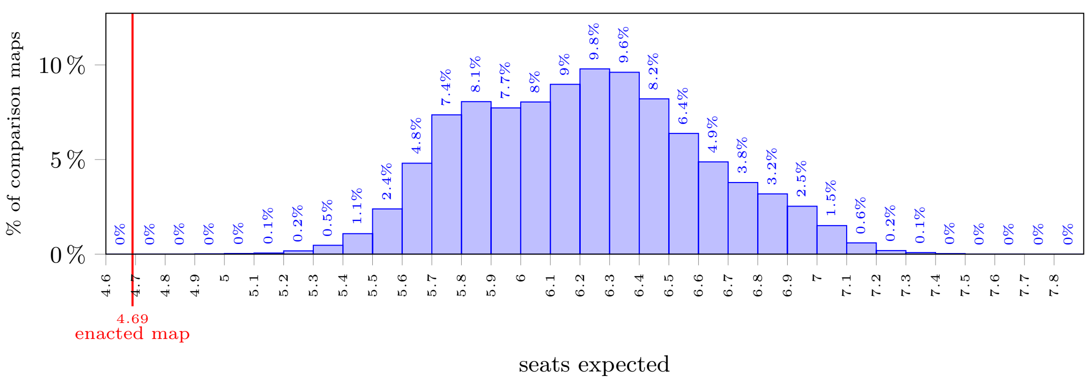
C.3 Robustness to compactness: 0% Polsby-Popper threshold

Here I show results when my analysis of the Congressional map is repeated with a 0% threshold for compactness in place of the 5% error I allow in my primary analysis.

C.3.1 Comparison map examples



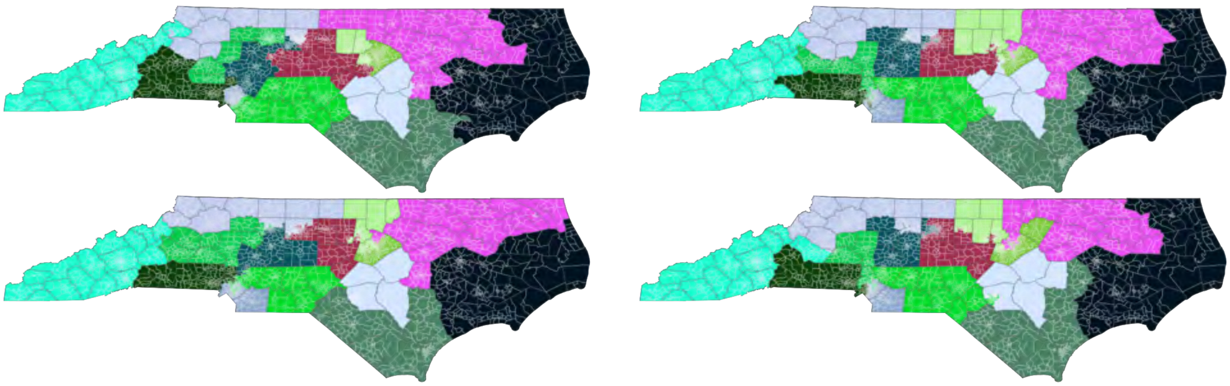
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99999989%	5	99.9999997%	9	99.9999975%	13	99.999979%
2	99.9999984%	6	99.99999983%	10	99.9999968%	14	99.9999968%
3	99.9999933%	7	99.9999962%	11	99.9999968%	15	99.9999983%
4	99.999986%	8	99.9999983%	12	99.99999954%	16	99.9999984%



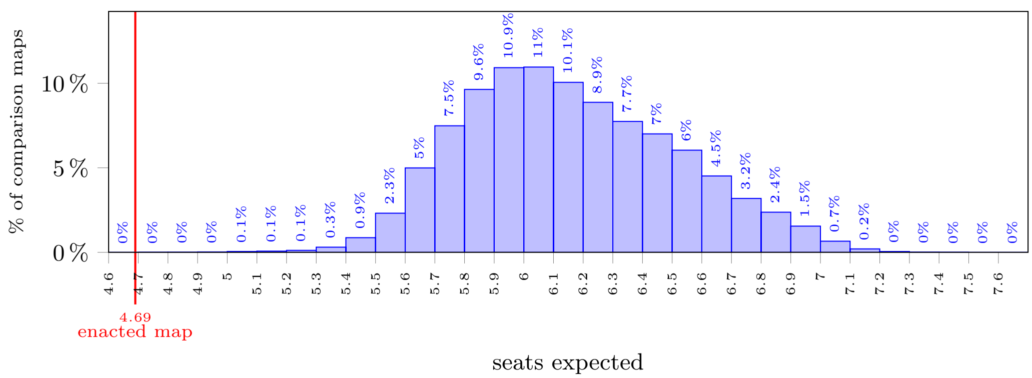
C.4 Robustness to compactness: 10% Polsby-Popper threshold

Here I show results when my analysis of the Congressional map is repeated with a 10% threshold for compactness in place of the 5% error I allow in my primary analysis.

C.4.1 Comparison map examples



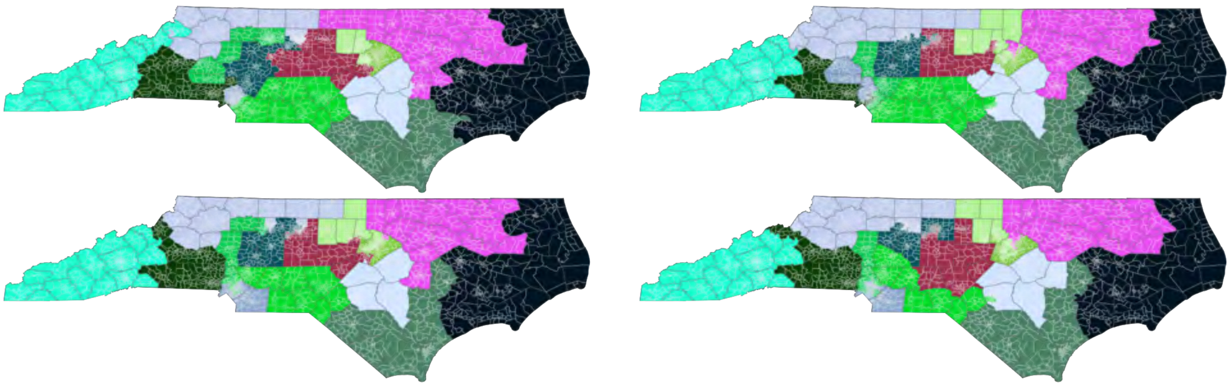
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999988%	5	99.9999974%	9	99.999982%	13	99.9999976%
2	99.9999989%	6	99.9999989%	10	99.9999954%	14	99.9999985%
3	99.9999961%	7	99.999999946%	11	99.9999965%	15	99.99999983%
4	99.99999981%	8	99.9999973%	12	99.9999999981%	16	99.99999985%



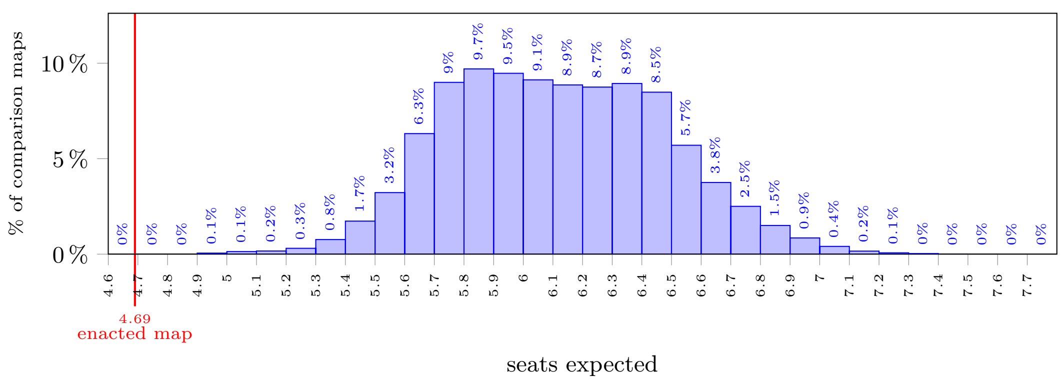
C.5 Robustness to compactness 5% Perimeter compactness

Here I show results when my analysis of the Congressional map is repeated with a completely different compactness score, based just on the total perimeter of all districts in the districting.

C.5.1 Comparison map examples



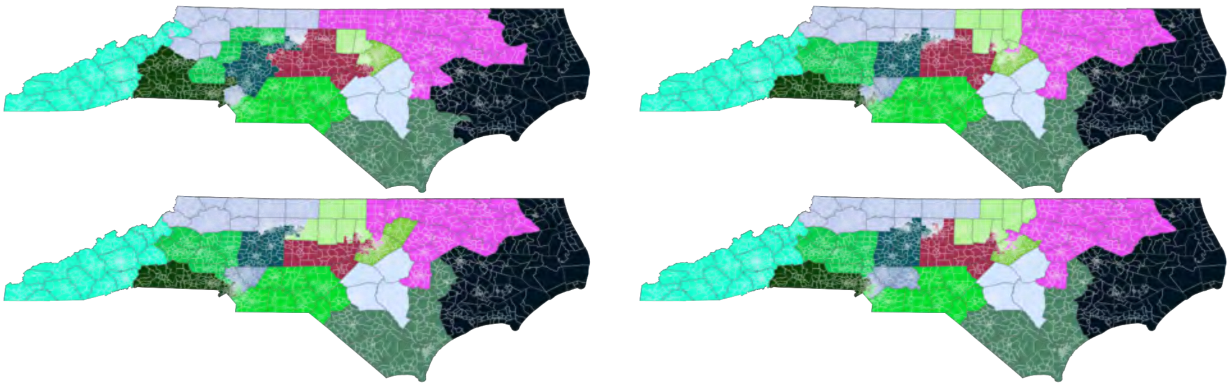
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999988%	5	99.9999968%	9	99.999998%	13	99.9999976%
2	99.99999948%	6	99.9999949%	10	99.9999978%	14	99.9999986%
3	99.99999941%	7	99.9999999976%	11	99.999982%	15	99.99999983%
4	99.99999981%	8	99.9999906%	12	99.9999999981%	16	99.9999963%



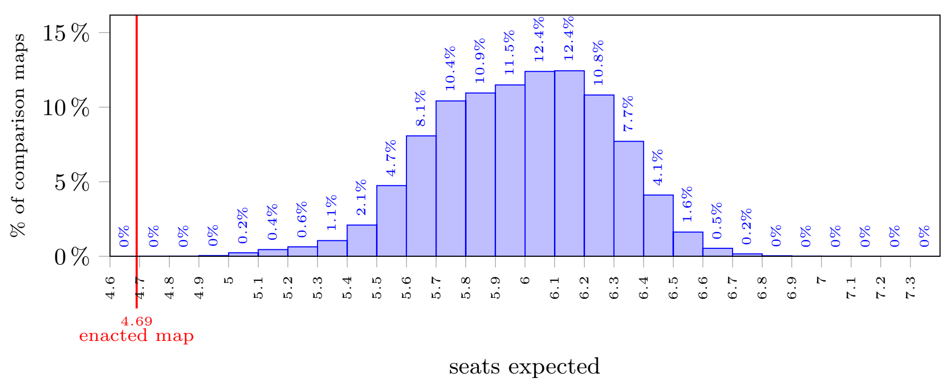
C.6 Robustness to 1% population deviation

Here I show results when my analysis of the Congressional map is repeated with a 1% population deviation constraint instead of a 2% population deviation constraint.

C.6.1 Comparison map examples



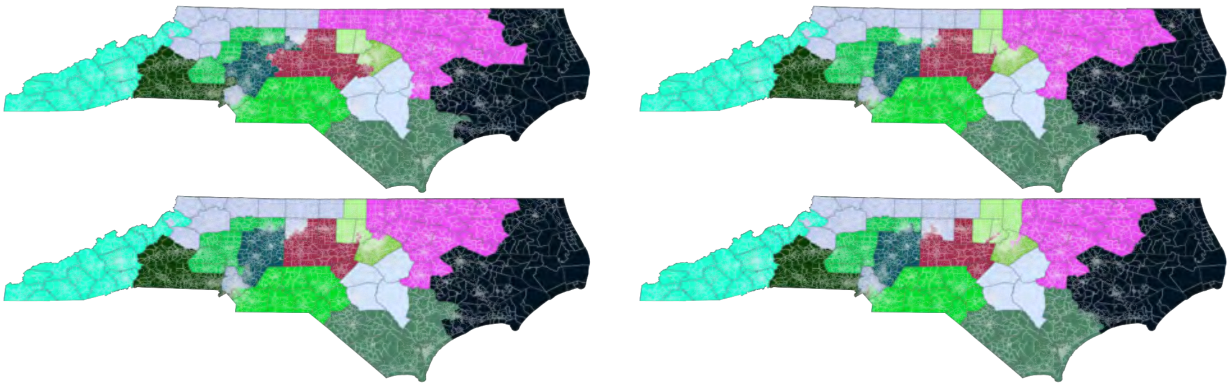
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999911%	5	99.999999907%	9	99.9999983%	13	99.999914%
2	99.9999966%	6	99.99999999945%	10	99.99978%	14	99.9999988%
3	99.999949%	7	99.9999986%	11	99.999989%	15	99.999971%
4	99.9999935%	8	99.999951%	12	99.999934%	16	99.999997%



C.7 Geounit analysis

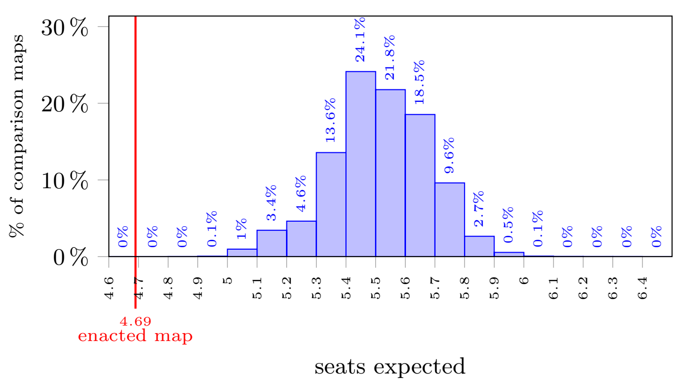
Here I show results when my analysis of the Congressional map is repeated at the geounit level, with a 0.5% population deviation constraint.

C.7.1 Comparison map examples



C.7.2 Results

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999952%	5	99.999987%	9	99.999962%	13	99.9999952%
2	99.999989%	6	99.999986%	10	99.9999964%	14	99.9999962%
3	99.999967%	7	99.9999924%	11	99.999974%	15	99.999926%
4	99.999964%	8	99.999996%	12	99.999977%	16	99.9999935%

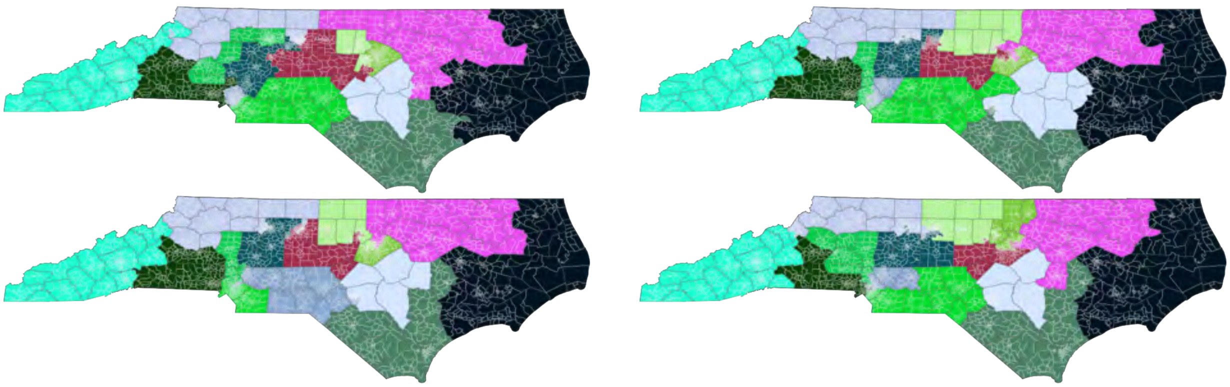


- **First level analysis:** In *every* run, the districting was in the most partisan 0.000073% of districtings (in other words, 99.999926% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.00022% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.99977% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.000073\%$.

C.8 Analysis of VTD-level blueprint

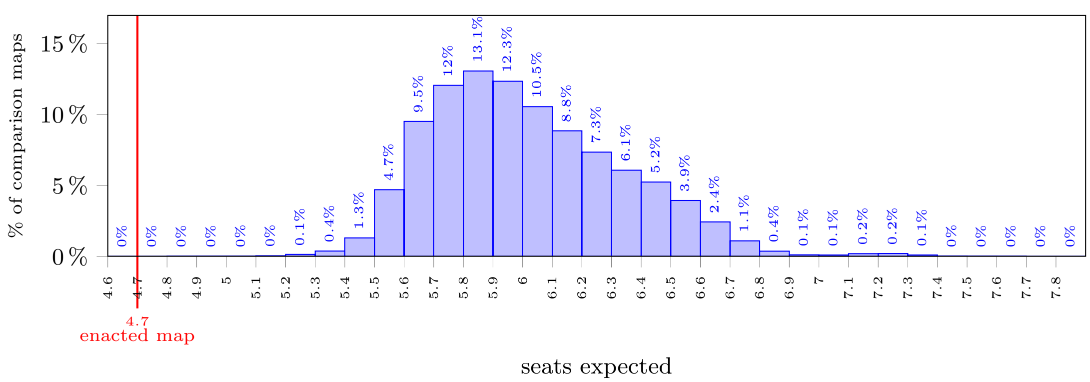
Here I show results when my analysis of the Congressional map is performed not on the precise enacted map, but a whole-VTD-level blueprint for the enacted map obtained by assigning each split VTD to the district it has the greatest intersection with.

C.8.1 Comparison map examples



C.8.2 Results

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999982%	9	99.99999969%	17	99.9999991%	25	99.9999986%
2	99.99999947%	10	99.9999952%	18	99.99999944%	26	99.9999998%
3	99.9999957%	11	99.999986%	19	99.999978%	27	99.9999977%
4	99.9999907%	12	99.999979%	20	99.9999959%	28	99.9999976%
5	99.9999981%	13	99.9999986%	21	99.99999946%	29	99.99999958%
6	99.99999954%	14	99.999984%	22	99.9999971%	30	99.999986%
7	99.9999917%	15	99.9999977%	23	99.9999974%	31	99.9999969%
8	99.9999917%	16	99.9999961%	24	99.9999942%	32	99.9999958%



- **First level analysis:** In *every* run, the districting was in the most partisan 0.000021% of districtings (in other words, 99.999978% were less partisan, in *every* run).
- **Second level analysis:** My theorems imply that the enacted districting is among the most optimized-for-partisanship 0.000064% of all alternative districtings of North Carolina satisfying my districting criteria (in other words, 99.999935% are less optimized-for-partisanship), measured by their ε-fragility for $\varepsilon = 0.000021\%$.

PEGDEN 2

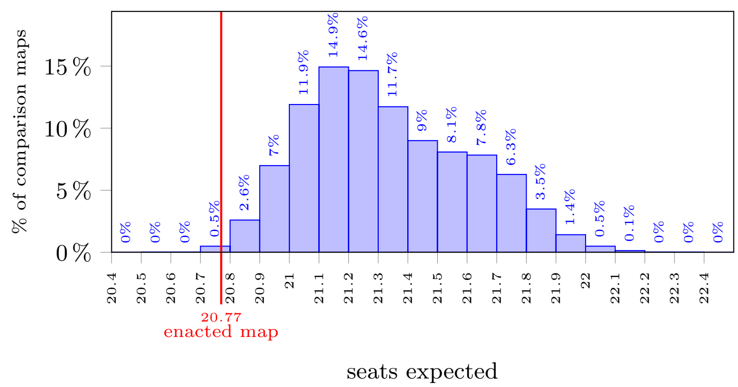
Appendix D Robustness Checks, Senate districting

D.1 Robustness to election data

Here I show results when my analysis of the Senate map is repeated with other elections in place of the 2020 Attorney General election as my proxy for partisan voting patterns.

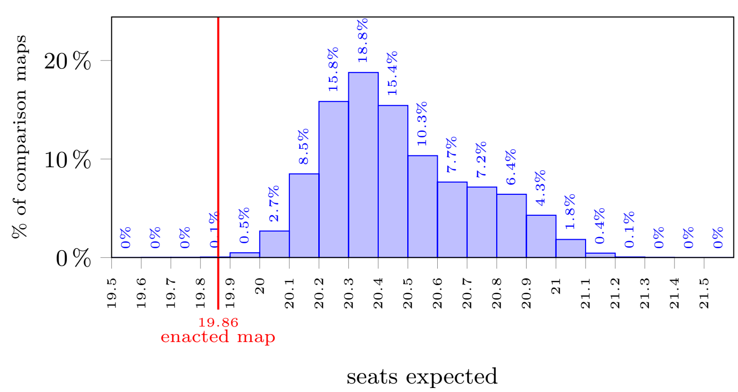
D.1.1 Results with 2020 Presidential election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.65%	5	99.78%	9	99.79%	13	99.8%
2	99.81%	6	99.79%	10	99.82%	14	99.73%
3	99.75%	7	99.79%	11	99.81%	15	99.66%
4	99.8%	8	99.75%	12	99.75%	16	99.81%



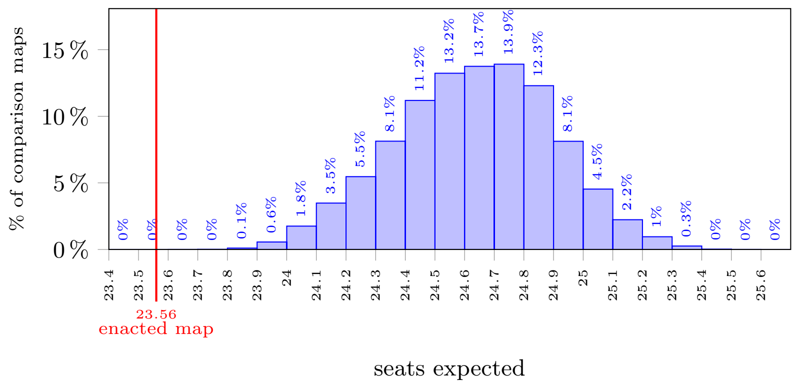
D.1.2 Results with 2020 Lieutenant Governor election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.943%	5	99.987%	9	99.9912%	13	99.9911%
2	99.996%	6	99.982%	10	99.9955%	14	99.977%
3	99.973%	7	99.994%	11	99.9958%	15	99.944%
4	99.9927%	8	99.983%	12	99.89%	16	99.995%



D.1.3 Results with 2020 Governor election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99999936%	5	99.9999996%	9	99.9999998%	13	99.999999973%
2	99.999999949%	6	99.9999974%	10	99.9999987%	14	99.9999985%
3	99.99999978%	7	99.9999999929%	11	99.9999998%	15	99.999999961%
4	99.9999989%	8	99.9999999969%	12	99.999999973%	16	99.9999985%

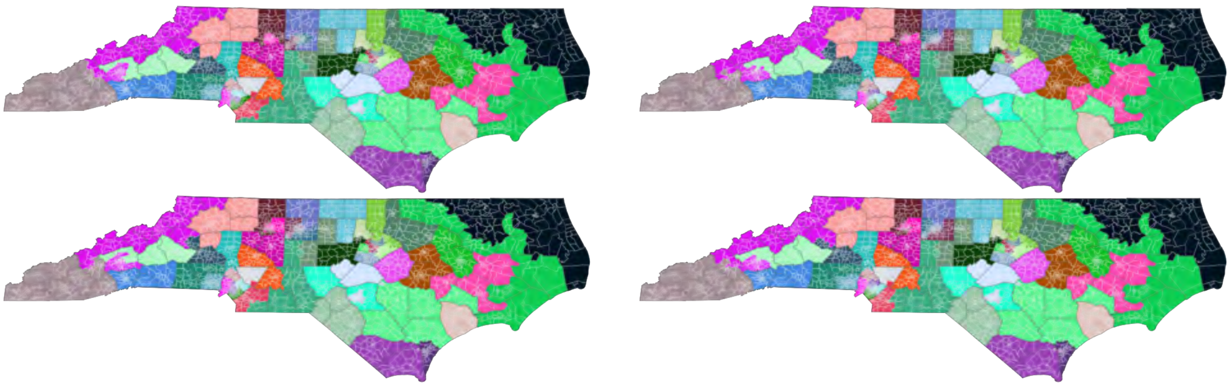


[Report continues on next page for formatting reasons]

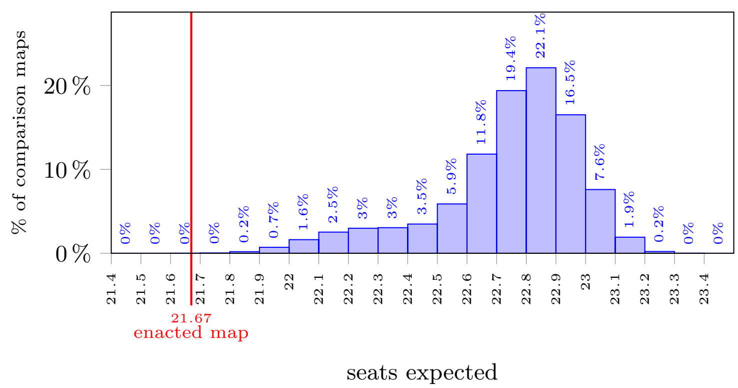
D.2 Robustness to incumbency protection

Here I show results when my analysis of the Senate map is repeated without ensuring the protection of incumbents.

D.2.1 Comparison map examples



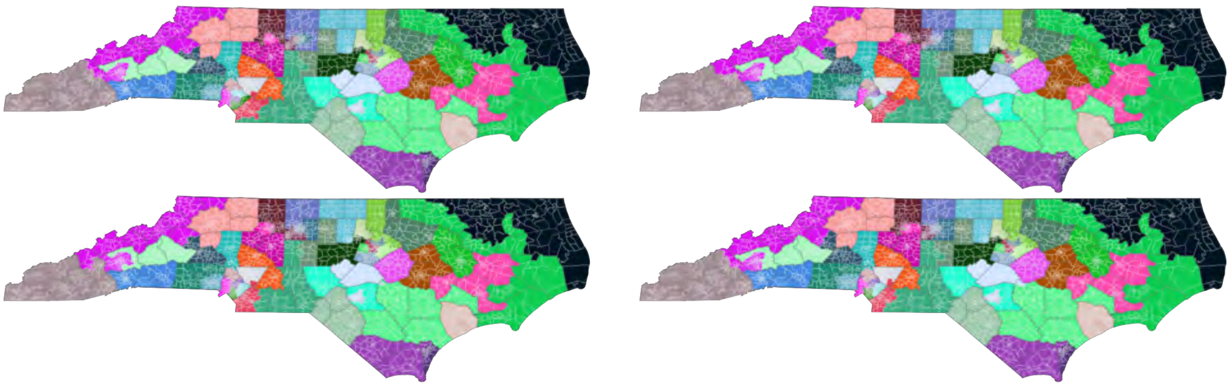
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9998%	5	99.9993%	9	99.99989%	13	99.99906%
2	99.99988%	6	99.99985%	10	99.99968%	14	99.9987%
3	99.99971%	7	99.999907%	11	99.9998%	15	99.99928%
4	99.99922%	8	99.9985%	12	99.99976%	16	99.9943%



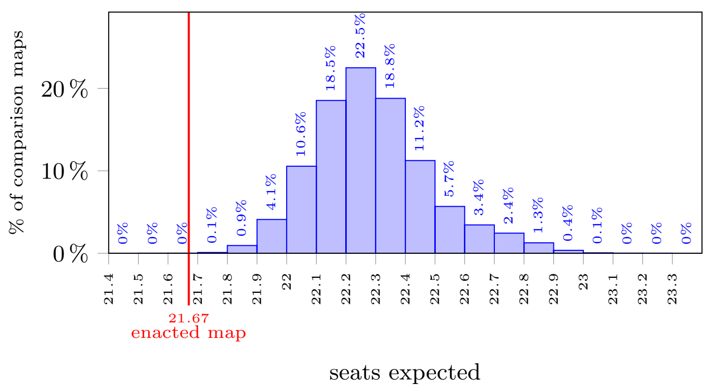
D.3 Compactness: 0% Polsby-Popper threshold

Here I show results when my analysis of the Senate map is repeated with a 0% threshold for compactness in place of the 5% error I allow in my primary analysis.

D.3.1 Comparison map examples



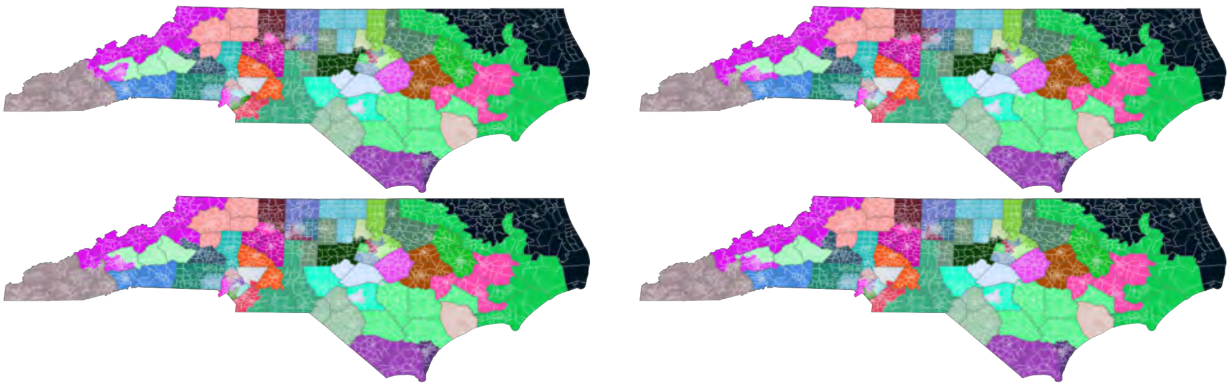
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9979%	5	99.9978%	9	99.995%	13	99.9986%
2	99.99909%	6	99.9968%	10	99.9982%	14	99.9989%
3	99.9968%	7	99.99933%	11	99.9987%	15	99.9973%
4	99.99927%	8	99.9979%	12	99.99923%	16	99.9976%



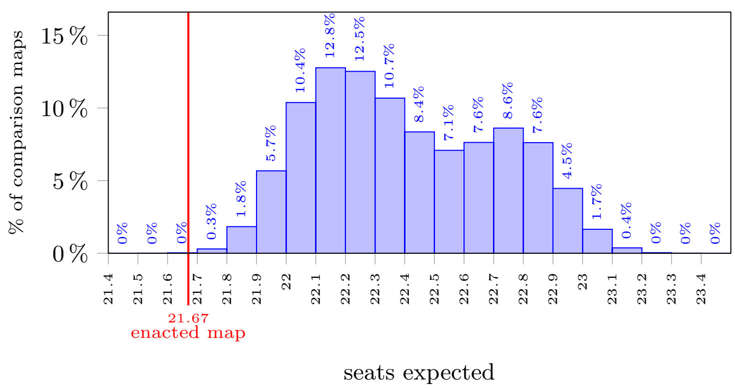
D.4 Compactness: 10% Polsby-Popper threshold

Here I show results when my analysis of the Senate map is repeated with a 10% threshold for compactness in place of the 5% error I allow in my primary analysis.

D.4.1 Comparison map examples



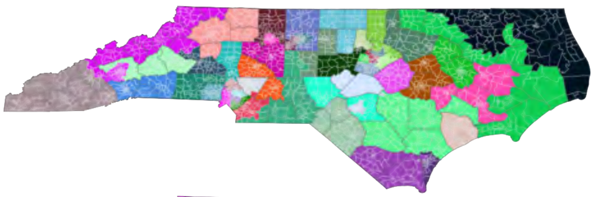
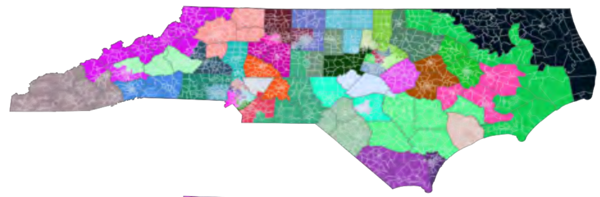
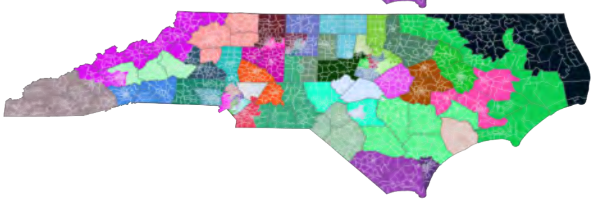
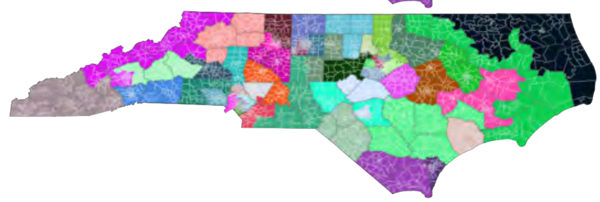
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9963%	5	99.992%	9	99.971%	13	99.98%
2	99.9928%	6	99.986%	10	99.985%	14	99.9917%
3	99.988%	7	99.993%	11	99.9924%	15	99.978%
4	99.987%	8	99.9957%	12	99.9908%	16	99.9969%



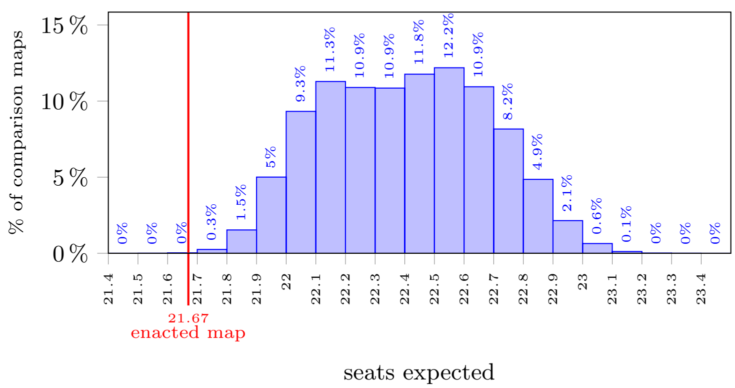
D.5 Compactness 5% Perimeter compactness

Here I show results when my analysis of the Senate map is repeated with a completely different compactness score, based just on the total perimeter of all districts in the districting.

D.5.1 Comparison map examples

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9913%	5	99.985%	9	99.988%	13	99.9907%
2	99.9907%	6	99.989%	10	99.988%	14	99.982%
3	99.9949%	7	99.9929%	11	99.986%	15	99.981%
4	99.989%	8	99.989%	12	99.987%	16	99.9919%



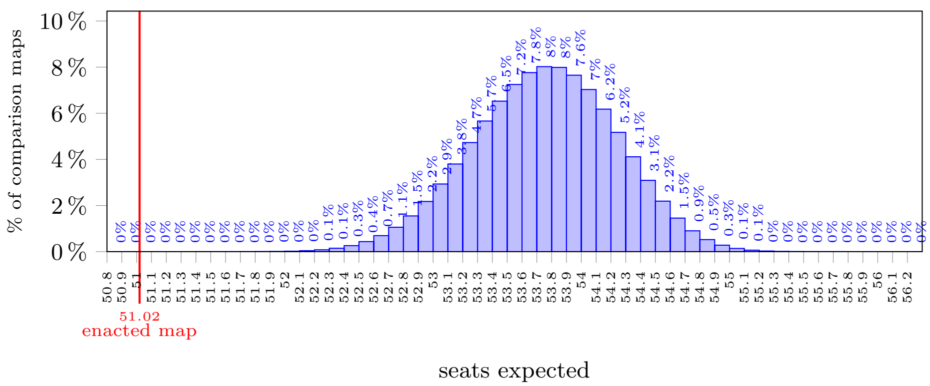
Appendix E Robustness Checks, House districting

E.1 Robustness to election data

Here I show results when my analysis of the House map is repeated with other elections in place of the 2020 Attorney General election as my proxy for partisan voting patterns.

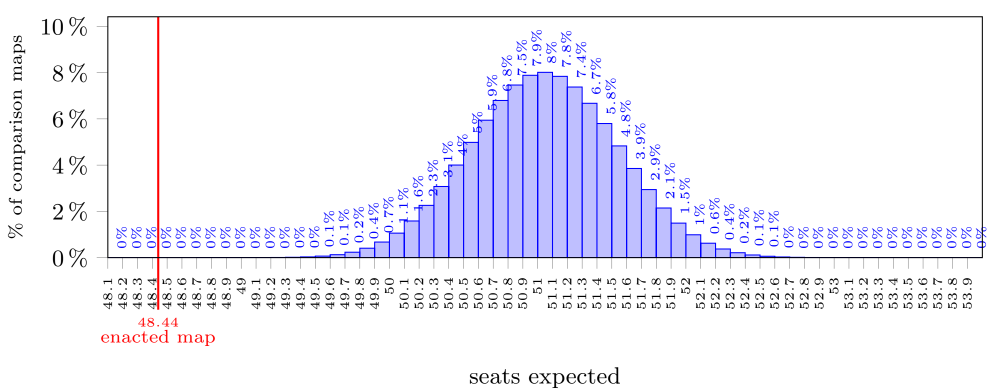
E.1.1 Results with 2020 Presidential election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.999999985%	5	99.99999945%	9	99.9999986%	13	99.99999986%
2	99.999999981%	6	99.99999948%	10	99.99999912%	14	99.999999976%
3	99.99999997%	7	99.999999963%	11	99.99999986%	15	99.99999984%
4	99.9999969%	8	99.9999981%	12	99.9999985%	16	99.9999989%



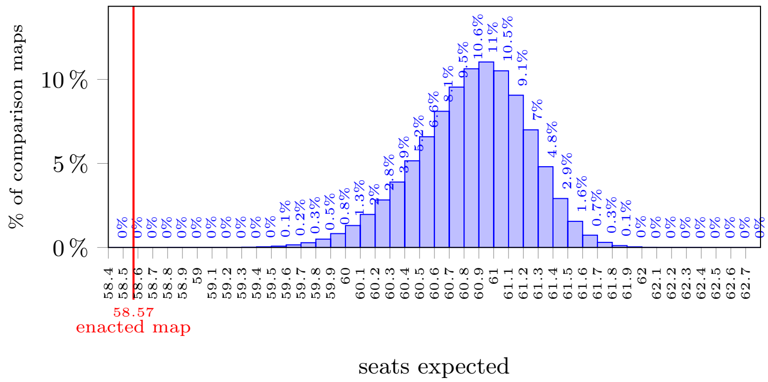
E.1.2 Results with 2020 Lieutenant Governor election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99999988%	5	99.9999983%	9	99.999997%	13	99.9999957%
2	99.999981%	6	99.9999926%	10	99.9999979%	14	99.9999905%
3	99.99999907%	7	99.9999927%	11	99.9999974%	15	99.99999914%
4	99.9999969%	8	99.999993%	12	99.9999981%	16	99.99999924%



E.1.3 Results with 2020 Governor election

Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999985%	5	99.999999931%	9	99.999999975%	13	99.99999986%
2	99.999999984%	6	99.9999994%	10	99.9999986%	14	99.99999988%
3	99.99999997%	7	99.999999986%	11	99.9999998%	15	99.99999948%
4	99.9999985%	8	99.99999985%	12	99.99999914%	16	99.99999989%

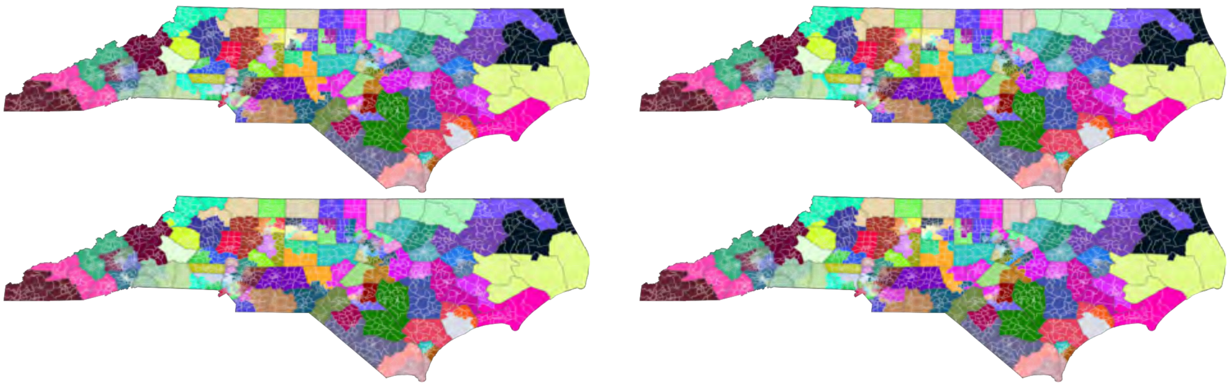


[Report continues on next page for formatting reasons]

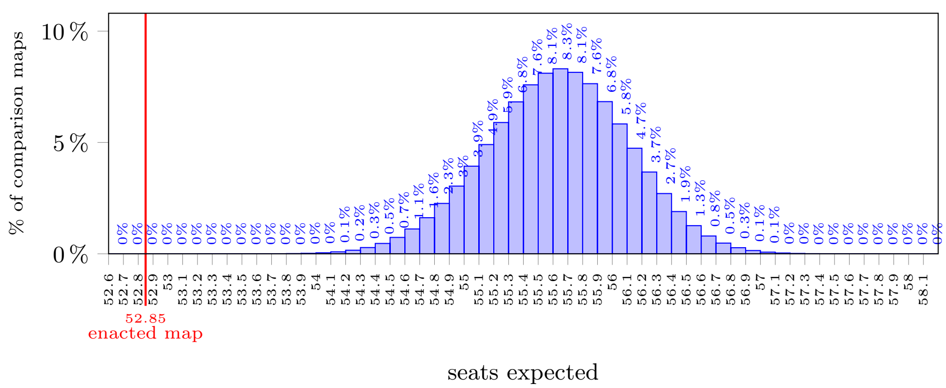
E.2 Robustness to incumbency protection

Here I show results when my analysis of the House map is repeated without ensuring the protection of incumbents.

E.2.1 Comparison map examples



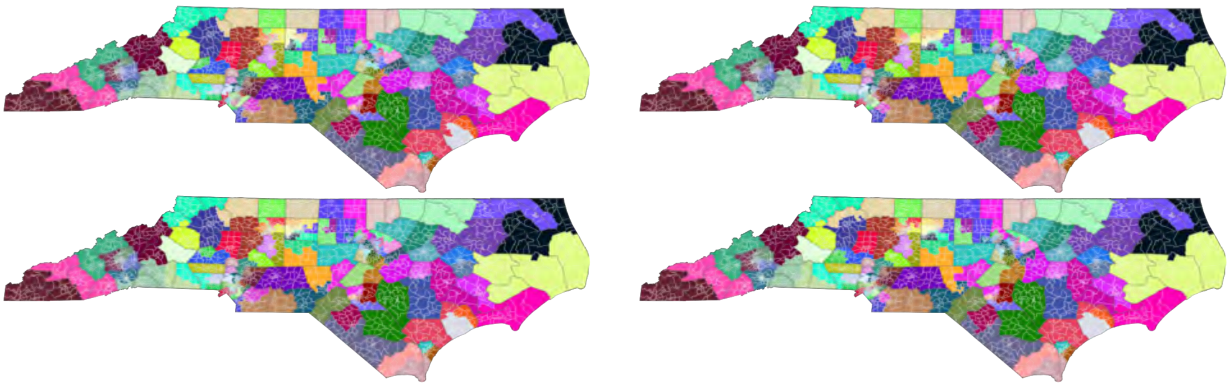
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99999987%	5	99.9999933%	9	99.99999967%	13	99.99999989%
2	99.999999981%	6	99.9999962%	10	99.99999944%	14	99.99999981%
3	99.99999997%	7	99.9999968%	11	99.9999944%	15	99.99999%
4	99.999999908%	8	99.99999961%	12	99.999999963%	16	99.99999947%



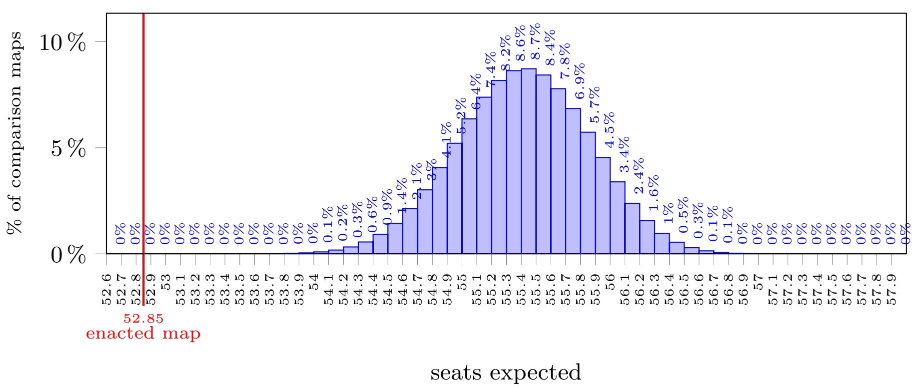
E.3 Compactness: 0% Polsby-Popper threshold

Here I show results when my analysis of the House map is repeated with a 0% threshold for compactness in place of the 5% error I allow in my primary analysis.

E.3.1 Comparison map examples



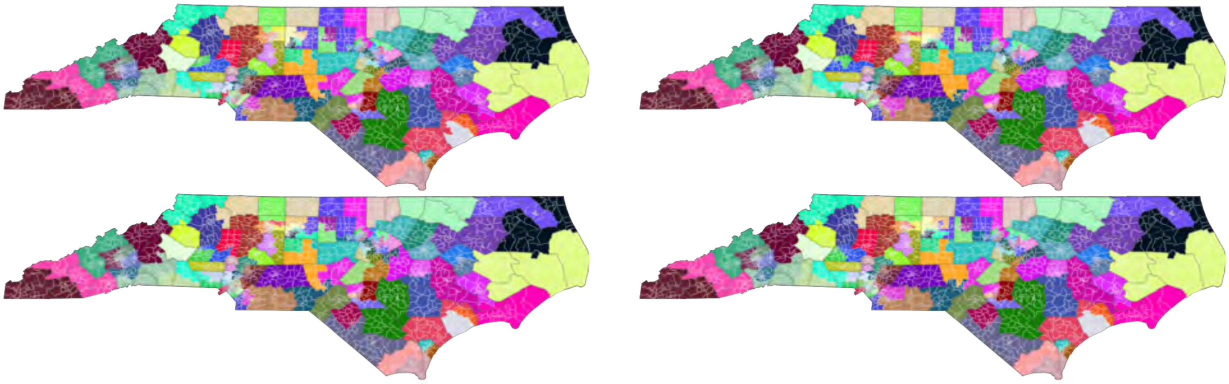
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999996%	5	99.99999927%	9	99.9999987%	13	99.9999978%
2	99.99999982%	6	99.999999941%	10	99.9999966%	14	99.9999986%
3	99.999987%	7	99.9999971%	11	99.9999963%	15	99.99999975%
4	99.9999912%	8	99.9999988%	12	99.99999928%	16	99.9999968%



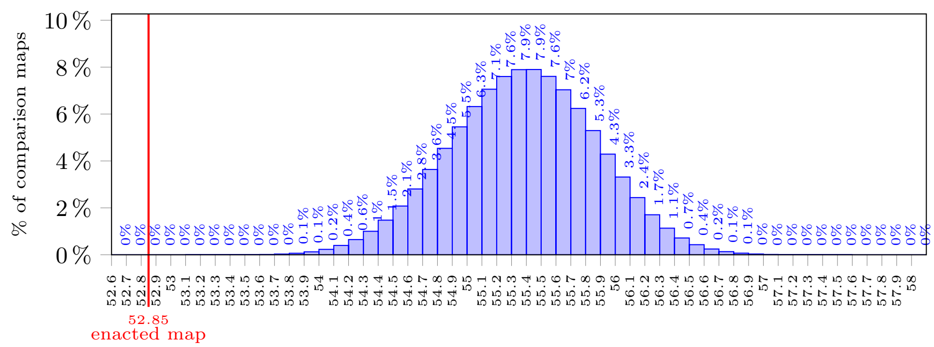
E.4 Compactness: 10% Polsby-Popper threshold

Here I show results when my analysis of the House map is repeated with a 10% threshold for compactness in place of the 5% error I allow in my primary analysis.

E.4.1 Comparison map examples



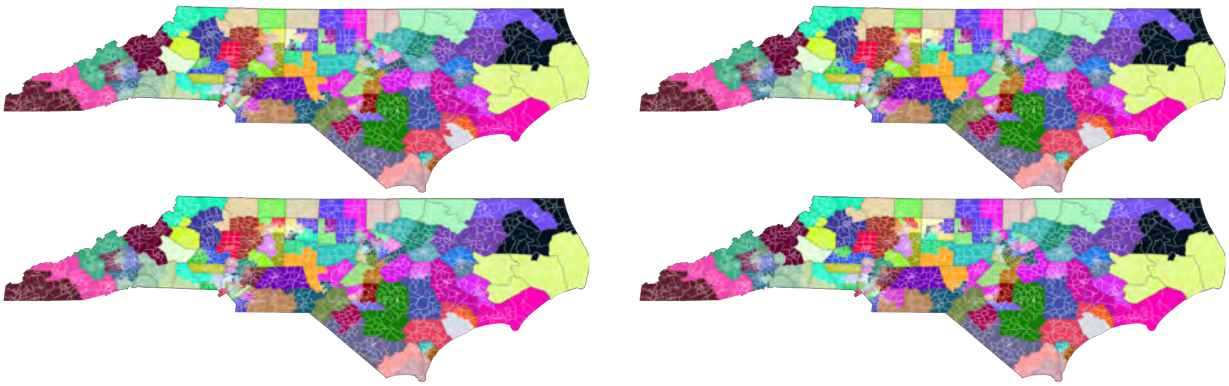
Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.9999904%	5	99.9999989%	9	99.999999917%	13	99.9999983%
2	99.999999957%	6	99.9999971%	10	99.9999983%	14	99.99999989%
3	99.9999948%	7	99.9999999916%	11	99.999988%	15	99.99999962%
4	99.9999987%	8	99.9999955%	12	99.9999922%	16	99.9999974%



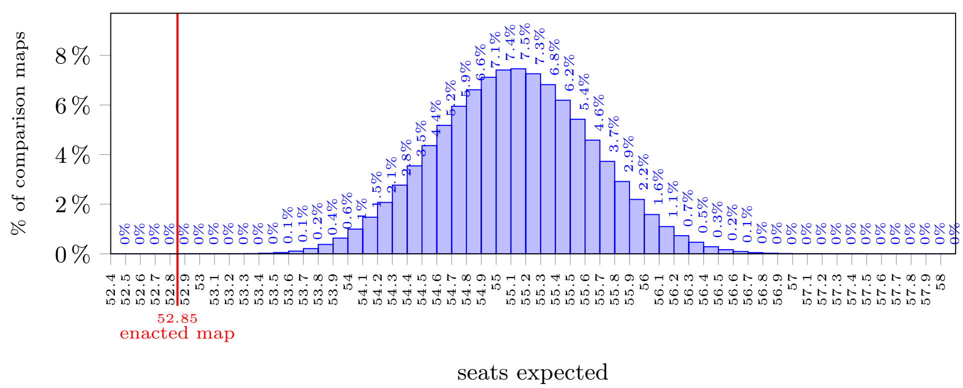
E.5 Compactness 5% Perimeter compactness

Here I show results when my analysis of the House map is repeated with a completely different compactness score, based just on the total perimeter of all districts in the districting.

E.5.1 Comparison map examples



Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan	Run	Percentage of comparison maps less partisan than enacted plan
1	99.99985%	5	99.999957%	9	99.999988%	13	99.999953%
2	99.999977%	6	99.999976%	10	99.999978%	14	99.99991%
3	99.99988%	7	99.9999904%	11	99.999968%	15	99.999981%
4	99.999978%	8	99.999951%	12	99.999925%	16	99.99995%



I hereby certify that the foregoing statements are true and correct to the best of my knowledge, information, and belief.

Wesley Pegden
12/23/2021

Rebuttal to report of Michael Barber

Wesley Pegden

December 28, 2021

1 Introduction

In his report, Michael Barber presents the results of simulated district plans as part of an analysis which purports to elicit whether the enacted House and Senate maps of North Carolina are "partisan outliers". Barber makes choices in his analysis that reduce its ability to detect gerrymandering North Carolina clusters; for example, he discusses the partisan bias of the enacted House and Senate maps through the lens of the whole number of "Democratric-lean" districts in one hypothetical election, a lens through which even the effects of extreme gerrymandering in NC county clusters—each with a small number of districts—are made to appear less dramatic.

Nevertheless, his primary analyses (Tables 2 and 32) still find the whole-state House and Senate plans to be partisan outliers compared to his simulated maps, according to the definition he lays out in his report; in particular, he reports the middle-50% of simulated maps to have 46-51 total "Democratic-lean" districts across the House clusters he analyzes, and reports that the enacted map contains 45 such districts. For the Senate he reports a middle-50% range of 19-19 total Democratic-lean districts in his simulations, and that the enacted map contains 16 such districts.

In fact, Barber incorrectly calculated the distribution of Democrat-leaning seats for the whole-state outcomes of his simulation analysis, incorrectly reporting the sums of lower- and upper-quartile seat counts in individual clusters as the lower- and upper-quartile for total statewide seats. When the distribution of "lean Democrat district" counts at the whole-state level are calculated correctly for Barber's simulations (still using the partisan index he defines), one finds that the middle-50% range for Barber's simulated maps in the House is actually 48-50 Democratic-lean districts, not 46-51 as Barber shows, and that **the enacted North Carolina House map lies in the most Republican-biased 00.18% of whole state maps composed of Barber's simulations, and the enacted North Carolina Senate map lies in the most Republican-based 00.39% of whole state maps composed of Barber's simulations.** This computation can be carried out entirely with the figures provided in Barber's report, and uses Barber's simulated maps and Barber's metric of partisan bias (number of lean-Democrat districts), calculated with Barber's own partisan voting index.

Finally, when re-analyzing Barber's simulated maps (as provided in his backup data) to compare their expected performance over a range of electoral outcomes rather than comparing the crude number of "lean Democratic districts" for a fixed election average, the differences between the enacted map and Barber's ensemble of simulated comparison maps becomes more dramatic at the cluster level as well. Through this lens, every cluster which my original analysis found to be optimized for partisanship would qualify as a partisan outlier according to Barber's "middle 50%" criterion, and many are extreme outliers, among the most Republican biased 10%, 1%, or 0.1% of maps, even in clusters where Barber reported that the enacted map was not be a partisan outlier.

2 Barber finds the enacted House and Senate maps to be outliers according to his own definition

On page 29 of his report, in the section on House clusters, Barber writes that he considers a districting plan of North Carolina to be a partisan outlier if it lies outside of the "middle 50%" of simulation results; in Barber's report, the middle 50% are the maps that lie between the 25th and 75th percentiles according to

NCLCV v. Hall
21 CVS 15426
LDTX182

Exhibit #
Pegden 3
JH-12/30/2021
exhibitsticker.com

the number of lean-Democrat districts, as measured with the partisan index Barber obtains by averaging election results. He calls this a "conservative definition" of an outlier, noting that "in the social sciences, medicine, and other disciplines it is traditional to consider something an outlier if it falls outside the middle 95% or 90% of the comparison distribution."

In both of his whole-state analysis tables (Table 2 and 32), Barber's own findings report the whole map as falling outside the middle 50% of simulated outcomes for the House and Senate. For example, in the last row, labeled "Total", of Table 2 on page 31, he reports that in the 26 clusters he analyzed, the enacted map contained 45 statewide "lean-Democrat" districts according to his partisan index, while the middle 50% range of the simulated maps for the total number of seats was $46 - 51$. Similarly, in Table 32 for the Senate, he reports the enacted map scored as having a total of 16 lean-Democrat seats in the 12 clusters used by the enacted map he analyzed, while the middle 50% range for his middle 50% range for the total number of seats in his simulated maps was 19-19. By the definition he chose to offer of a partisan outlier, Barber finds the enacted House and Senate plans are partisan outliers.

3 Barber reports incorrect quartiles for totals across clusters

Recall that in his Table 2, in the last column, Barber reports the range of the "middle 50%" for the number of lean-Democratic districts for his simulations in each cluster, and, at the bottom of the column, for the total across clusters (he reports the range for this total as 46-51). Recall that the bottom of the middle-50% range is the lower quartile of the data, and the top of the range is the upper quartile.

For example, in the House:

- for the Buncombe cluster in the House map, Barber reports in Figure 45 that 28% of his simulated maps contained 2 lean-Democrat districts, while 72% contained 3.
- for the Cumberland cluster in the House map, Barber reports in Figure 55 that 82% of his simulated maps contained 3 districts, while 18% contained 4.

I summarize this information in my Table 1, below:

Cluster	0	1	2	3	4
Buncombe			28%	72%	
Cumberland				82%	18%

Table 1: Fraction of maps with various lean-Democrat-district counts, as reported by Barber for Buncombe and Cumberland county districtings.

In his Table 2, Barber correctly summarizes the middle 50% ranges for the data in each of these clusters as 2-3 and 3-3, respectively; in each case, the lower end of the range is the smallest value below which 25% of his simulated maps lie, and the upper end is the smallest value below which 75% lie.

Suppose though, just as an example, that we wished to calculate the distribution of the total number of lean-Democrat districts across just these two clusters according the Barber's simulations; this will also enable us to calculate the middle-50% of outcomes for the total lean-Democrat districts across these two clusters.

Note that for maps of these two clusters composed of maps from Barber'simulations, a total of 5, 6, or 7 lean-Democrat districts are possible. For example, 5 lean-Democrat districts can arise only by having 2 such districts in Buncombe and 3 in Cumberland, and fewer are not possible.

According to Barber's simulations, as summarized in Table 1, 28% of the maps of these two clusters would have 2 lean-Democrat districts in Buncombe, while 82% would have 3 lean-Democrat districts in Cumberland. As the districtings in each cluster can be chosen independently of each other, a total of

$$28\% \times 82\% = 22.96\%$$

of districtings of these two counties would have a total of 5 lean-Democrat districts. (Note that having fewer than 5 lean-Democrat seats happens 0% of the time, according to Barber's simulations.)

6 lean-Democrat districts can arise from having 2 lean-Democrat districts in Buncombe and 4 in Cumberland, or having 3 lean-Democrat districts in Buncombe and 3 in Cumberland. Thus according to Barber's simulation results the frequency of this outcome would be

$$28\% \times 18\% + 72\% \times 82\% = 64.08\%.$$

Finally, the likelihood of 7 lean-Democrat seats, which arise just when there are 3 lean-Democrat districts in Buncombe and 4 lean-Democrat districts in Cumberland, would be

$$72\% \times 18\% = 12.96\%,$$

(Note that altogether, 22.96%+64.08%+12.96%=100%.)

Evidently, the middle-50% range for the total of lean-Democrat seats across these two counties would be 6-6; the 6-lean-Democrat-district maps include the middle-50% of simulated maps. (6 is both the 25th percentile and the 75th percentile of the number of Democratic-lean seats in the simulated maps.)

Under Barber's incorrect approach, he would have simply added the bottom and top of the middle-50% ranges for Buncombe and Cumberland (2-3 and 3-3, respectively) to arrive at a middle-50% range for the total number of lean-Democrat-districts across these two counties; that procedure would produce a range of 5-6, which is wider than the true middle-50% range of the total number of districts across the two counties (namely 6-6), as correctly calculated above.

In general, the magnitude of this error grows larger and larger the more independent cluster-specific results are aggregated by incorrectly summing the lower and upper quartiles as a substitute for a correct calculation of the distribution of total statewide lean-Democrat districts. In Barber's report, he aggregrates across 26 clusters in this way. As we will see in the next section, this has the effect of inflating the true middle-50% range of 48-50 to an incorrectly reported range of 46-51.

Technical Remark. Probability generating functions can be used to allow larger calculations of the same type as the one above to be performed using publicly web-based computer algebra systems instead of by programming or using statistical software. Note that precisely the same three calculations above would have been performed if expanding the algebraic expression

$$\begin{aligned}(.28x^2 + .72x^3)(.82x^3 + .18x^4) &= (.28 \times .82)x^5 + (.28 \times .18 + .72 \times .82)x^6 + (.72 \times .18)x^7 \\ &= .2296x^5 + .6408x^6 + .1296x^7.\end{aligned}$$

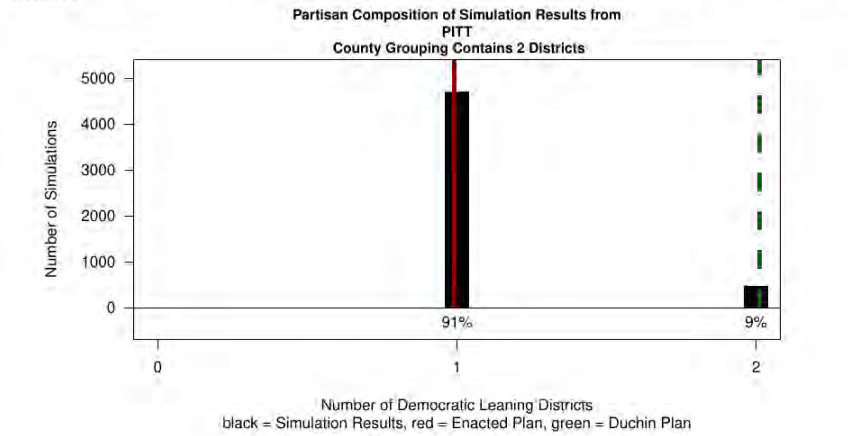
Observe that the polynomial $.28x^2 + .72x^3$ here can be seen as representing the fact that two seats occur in 28% of the maps for Buncombe, while 3 seats occur in 72% of the maps. (Similarly, then, for Cumberland and the polynomial $.82x^3 + .18x^4$.) The same answers that we found above for the fraction of simulated plans with a total of 5, 6, and 7 lean-Democrat districts, respectively, can be read off as the coefficients of x^5, x^6, and x^7, in the resulting expansion.

In the technical remark in the next section, I will point out a similar polynomial expansion which can verify the next section's calculations using public web applications, making the main findings of this rebuttal report easy to independently verify.

4 Correcting Barber's calculations

In my Table 2 on page 13 of this rebuttal report, I report the results of Barber's Figures 11, 14, 17, 20, 25, 28, 31, 34, 37, 45, 48, 51, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85, and 88. Each of these figures reports, for one of the clusters Barber analyzes, the fraction of his simulated maps which achieve different numbers of "lean Democrat" districts according to the partisan index he uses. For example, in Figure 14 on page 44, Barber reports that 91% of his simulated maps had one lean-Democrat district, while the remaining 9% had 2, as seen in this reproduction below:

Figure 14: **Distribution of Partisan Districts from Simulations in Pitt House County Cluster**



This information is then reproduced in my Table 2 on page 13, as the following row:

Cluster	0	1	2	3	4	5	6	7	8	9	10	11	12
Pitt		91%	9%										

In particular, everything in my Table 2 (and the corresponding Table 3 for the Senate) is taken directly from Barber's report itself.

The data in Table 2 can then be used to calculate the distribution of the total number of lean-Democrat seats based on Barber's simulations across the 26 clusters, exactly in the same way as we did above for just 2 clusters from the data in Table 1. The result of the same calculation is the histogram shown in Figure 1. In particular, according to Barber's own simulated map set, and using his own measure of the number of lean-Democrat districts under his own partisan index, **the enacted House map exhibits more Republican bias than 99.82% of maps** composed of Barber's simulations, over the clusters Barber analyzes.

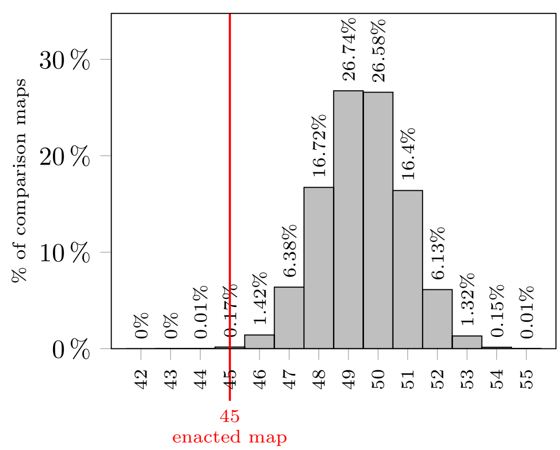


Figure 1: **Total lean-Democrat districts across Barber's House simulations**. This histogram shows the performance of Barber's simulated map set across the total set of House clusters Barber analyzes. It uses Barber's set of simulated maps, Barber's chosen metric (number of lean Democratic seats), calculated using the partisan metric Barber himself calculates in his report. The range 49-50 contains 50% of the simulated maps, the range 48-51 contains 86% of the simulated maps, and the range 47-52 contains more than 98% of the simulated maps. With 45 lean-Democratic districts across these clusters, the enacted map is in the most Republican-biased 0.18% of Barber's simulated maps.

In Table 3 I show Barber's Senate data analogous to the House data I show in Table 2. And in Figure 2, I plot the histogram showing the total of Barber's metric of Democratic-leaning districts across Barber's simulated map set, produced in the same way as I produce Figure 1 for the House. In particular, according to Barber's own simulated map set, and using his own measure of the number of lean-Democrat districts under his own partisan index, **the enacted Senate map exhibits more Republican bias than 99.61% of maps** over the clusters Barber analyzes.

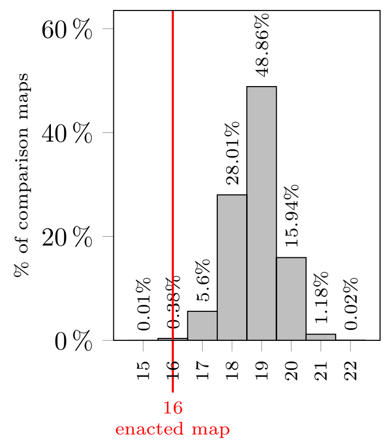


Figure 2: **Total lean-Democrat districts across Barber's Senate simulations**. This histogram shows the performance of Barber's simulated map set across the total set of Senate clusters Barber analyzes. It uses Barber's set of simulated maps, Barber's chosen metric (number of lean Democratic seats), calculated using the partisan metric Barber himself calculates in his report. The range 18-20 contains 93% of the simulated maps, and the range 17-21 contains more than 99% of the simulated maps. With 16 lean-Democrat districts, the enacted map is among the most Republican 00.39% of maps.

Technical Remark. As noted in the earlier Technical Remark, calculating the results of a histogram like Figure 1 is equivalent to expanding a certain polynomial expression. Based on the data in Table 2, (rows with only zero seats possible can be ignored), the polynomial to be expanded is

$$(.91x+.09x^2)(.44+.56x)(x^2)(x^2)(x)(.28x^2+.72x^3)(.82x^3+.18x^4)(x^4)(x)(.33x^2+.5x^3+.17x^4)(.99+.01x^1)$$
$$\cdots(.18+.82x)(.01x^4+.79x^5+.21x^6)(.01x^{10}+.56x^{11}+.44x^{12})(.02x^{10}+.32x^{11}+.66x^{12})$$

and publicly available tools such as `wolframalpha.com` can be used to verify that this polynomial expands to

$$5.55283\times10^{-7}\ x^{56}+0.0000685893x^{55}+0.00147488x^{54}+0.0131615x^{53}$$
$$+0.0612515x^{52}+0.163979x^{51}+0.265839x^{50}+0.267369x^{49}+0.167218x^{48}+0.0637935x^{47}+0.0141775x^{46}$$
$$+0.00167669x^{45}+0.000089375x^{44}+1.74341\times10^{-6}\ x^{43}+1.08123\times10^{-8}\ x^{42}$$

The histogram in Figure 1 can be read off the coefficients in this polynomial. For example, the fact that the coefficient of x^{49} is .267369 corresponds to the fact that Figure 1 reports the fraction of simulated maps with a total of 49 Democrat-leaning districts across the clusters Barber analyzes as 26.74% (rounded to two decimal places).

For the senate, from Table 3, the probability generating function is

$$(.77x+.23x^2)(x^2)(.23+.77x)(.93x^2+.06x^3)(.01x^4+.24x^5+.75x^6)(.05x^4+.95x^5)x(.97x+.03x^2),$$

which expands to

$$0.000227131x^{22}+0.0118152x^{21}+0.159415x^{20}+0.488577x^{19}$$
$$+0.280141x^{18}+0.0559707x^{17}+0.00377389x^{16}+0.0000807399x^{15} \quad (1)$$

giving the results shown in Figure 2.

5 A more sensitive cluster-by-cluster analysis of Barber's maps

In the previous section, I showed that even against Barber's simulated maps, using the partisan index Barber calculates, and using Barber's preferred metric for partisan bias (the number of lean-Democrat districts using that partisan index), both the enacted House and Senate plans are extreme partisan outliers.

This is true despite the fact that using the number of whole lean-Democrat districts with only a single proxy for partisanship is unlikely to capture the effects even of extreme gerrymandering in North Carolina county clusters, where a small number of seats are at stake in each, and the effects of extreme gerrymandering can be to put one or two seats into play (or take them out of contention), even in cases where districts do not change columns in a single hypothetical election.

In other words, I take Barber's single partisan index (which has a two-party statewide Democratic vote-share of XX), and analyze what would happen under his simulations, on average, if you swung the election results so that Democrats did better or worse by a normally-distributed swing matched to past statewide North Carolina elections. This is the same metric I used in my initial report.

In this section, I re-analyze Barber's results, still using his simulated maps, and still using his partisan index, but comparing maps in each cluster using the seats-expected metric (calculated with respect to that index), which evaluates how a map would be expected to perform under a range of conditions rather than one fixed hypothetical election.

Below, I conduct this analysis for every county cluster I analyzed in my original expert report. In every cluster for which my analysis found the enacted map to be among the most optimized-for-partisanship possible maps (the first six House analyzed in the subsections below, and every Senate cluster analyzed below), Barber finds the map to be a partisan outlier according to the "middle-50%" definition he uses in his report. I summarize the outlier status of these 6+5 House and Senate clusters according to Barber's simulations in the following table:

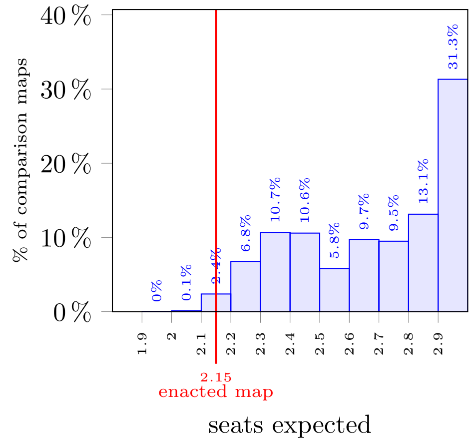
Cluster	Enacted map among most Republican-biased...
House: Buncombe	00.797%
House: Forsyth-Stokes	00.0805%
House: Guilford	00.00646%
House: Mecklenburg	04.43%
House: Wake	05.78%
House: Pitt	24.2%
Senate: Cumberland-Moore	00.0024%
Senate: Forsyth-Stokes	00.01%
Senate: Granville-Wake	00.035%
Senate: Guilford-Rockingham	00.25%
Senate: Iredell-Mecklenburg	00.1%
	... against Barber's simulations.

Among the four remaining clusters in my report, there are two where the enacted maps are nevertheless extreme outliers against Barber's simulation sets. I summarize the results for these four clusters in the following table:

Cluster	Enacted map among most Republican-biased...
House: Alamance	39.4%
House: Brunswick-New Hanover	73.9%
House: Durham-Person	00.00265%
House: Cabarrus-Davie-Rowan-Yadkin	00.352%
	... against Barber's simulations.

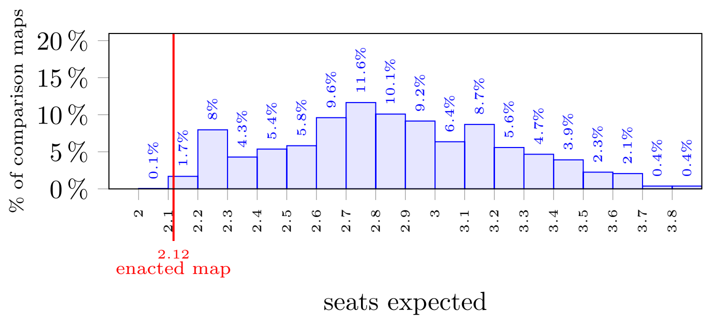
PEGDEN 3

5.1 House: Buncombe



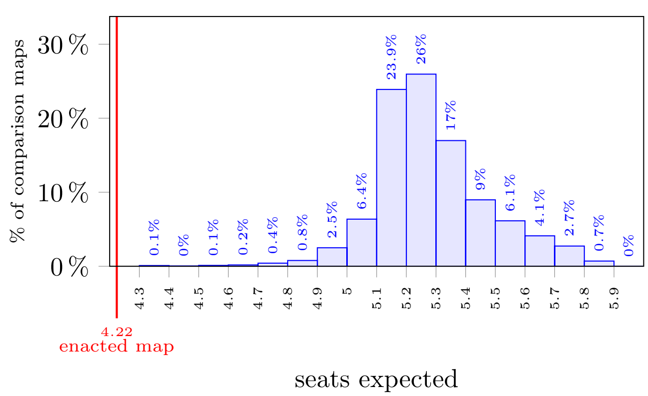
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.797% of maps.

5.2 House: Forsyth-Stokes



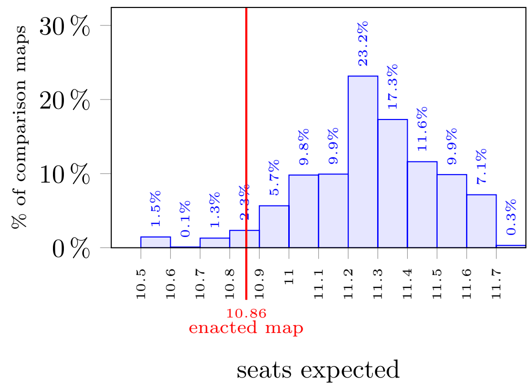
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.0805% of maps.

5.3 House: Guilford



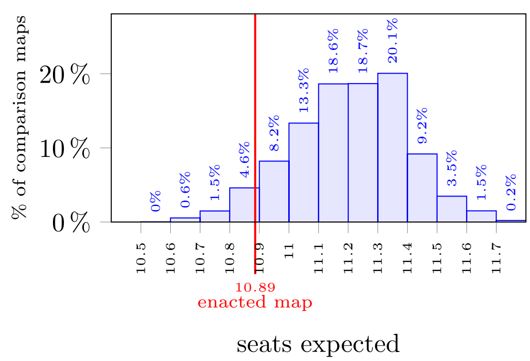
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.00646% of maps.

5.4 House: Mecklenburg



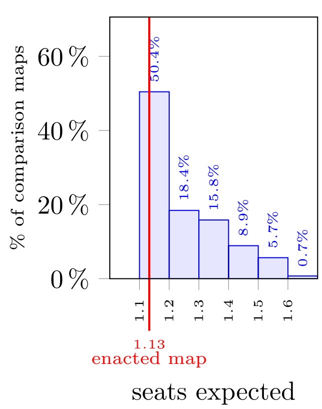
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 4.43% of maps.

5.5 House: Wake



Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 5.78% of maps.

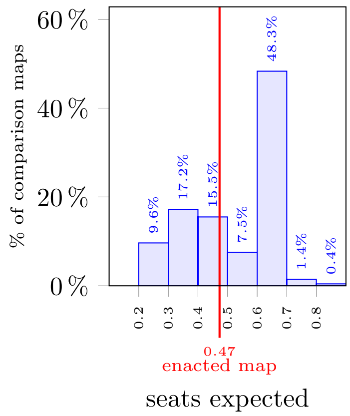
5.6 House: Pitt



Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 24.2% of maps.

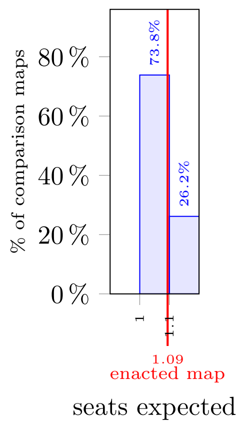
PEGDEN 3

5.7 House: Alamance



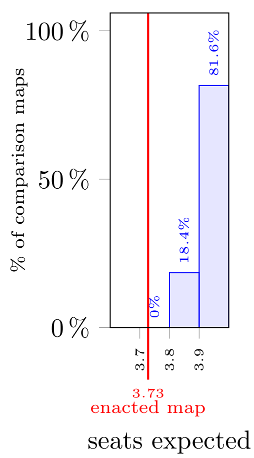
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map is not an outlier.

5.8 House: Brunswick-New Hanover



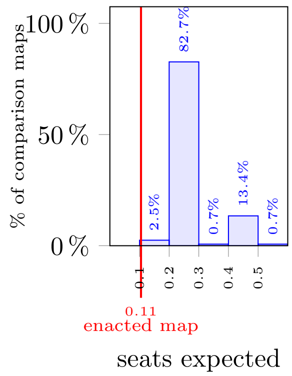
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map is not an outlier.

5.9 House: Durham-Person



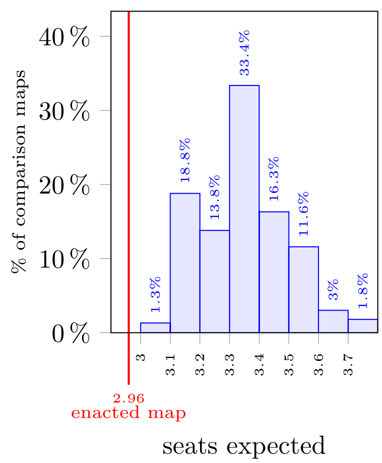
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.00265% of maps.

5.10 House: Cabarrus-Davie-Rowan-Yadkin



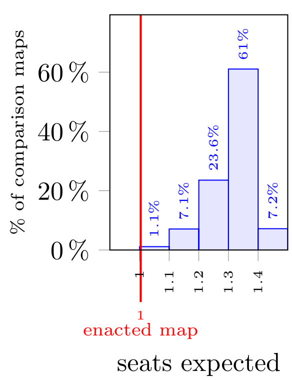
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.352% of maps.

5.11 House: Cumberland



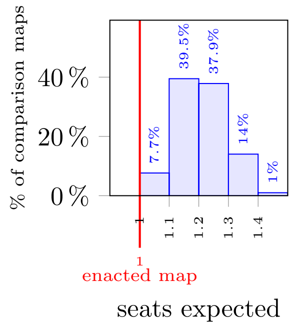
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.0095% of maps.

5.12 Senate: Cumberland-Moore



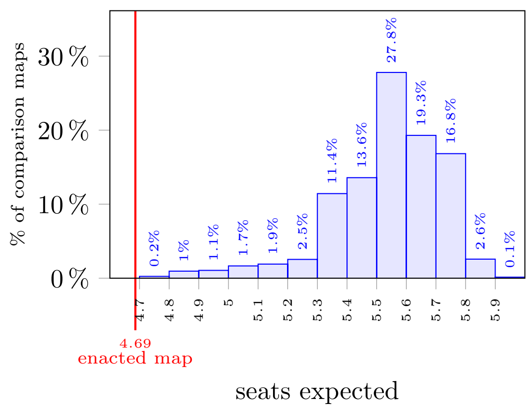
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.00235% of maps.

5.13 Senate: Forsyth-Stokes



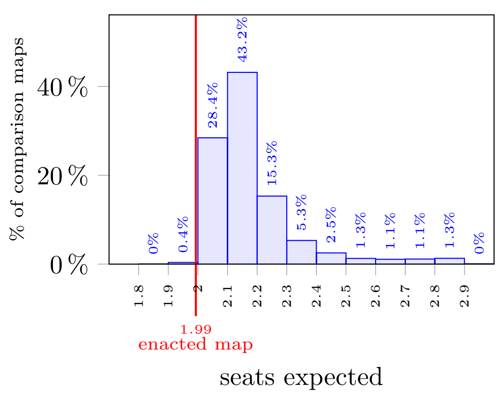
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.0104% of maps.

5.14 Senate: Granville-Wake



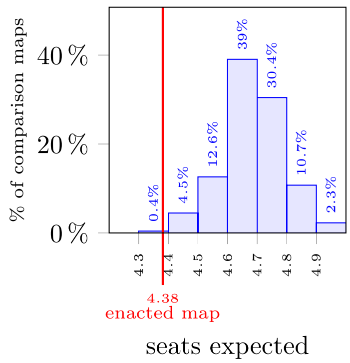
Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.0353% of maps.

5.15 Senate: Guilford-Rockingham



Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.251% of maps.

5.16 Senate: Iredell-Mecklenburg



Against the comparison-set of Barber's simulated maps for this cluster, the enacted map in this cluster is among the most Republican-biased 0.104% of maps.

Cluster	0	1	2	3	4	5	6	7	8	9	10	11	12
Davidson	100%												
Pitt		91%	9%										
Alamance	44%	56%											
Columbus-Robeson	100%												
Carteret-Craven													
Duplin-Wayne	100%												
Nash-Wilson			100%										
Caswell-Orange			100%										
Alexander-Surry-Wilkes	100%												
Franklin-Granville-Vance		100%											
Alleghany-*etc*	100%												
Beaufort-*etc*	100%												
Buncombe			28%	72%									
Anson-Union	100%												
Onslow-Pender	100%												
Cumberland				82%	18%								
Harnett-Johnston	100%												
Catawba-Iredell	100%												
Durham-Person					100%								
Brunswick-New Hanover		100%											
Forsyth-Stokes			33%	50%	17%								
Cabarrus-*etc*	99%	1%											
Chatham-*etc*	18%	82%											
Guilford					1%	79%	21%						
Avery-*etc*	100%												
Mecklenburg											1%	56%	44%
Wake											2%	32%	66%

Table 2: This table collects in one place the fraction of maps in Barber's House simulation sets realizing each number of lean-Democratic seats, as reported by Barber in his Figures 11, 14, 17, 20, 25, 28, 31, 34, 37, 45, 48, 51, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85, and 88. He does not present figures for the clusters in Alleghany-Ashe-Caldwell-Watauga and Beaufort-Chowan-Currituck-Dare-Hyde-Pamlico-Perquimans-Tyrrell-Washington clusters because his 0-Democratic-district results for those clusters are based on a very small number of maps. For Carteret-Craven his method does not produce any maps.

Cluster	0	1	2	3	4	5	6
Cumberland-Moore		77%	23%				
Chatham-Durham			100%				
Alleghany-*etc*	100%						
Brunswick-Columbus-New Hanover	23%	77%					
Bladen-*etc*	100%						
Guilford-Rockingham			94%	6%			
Alamance-*etc*	100%						
Granville-Wake					1%	24%	75%
Iredell-Mecklenburg					5%	95%	
Buncombe-Burke-McDowell		100%					
Cleveland-Gaston-Lincoln	100%						
Forsyth-Stokes		97%	3%				

Table 3: This table collects in one place the fraction of maps in Barber's Senate simulation sets realizing each number of lean-Democratic seats, as reported by Barber in his Figures 95, 98, 103, 106, 110, 113, 117, 120, 123, 128. He does not present figures for the Bladen-Duplin-Harnett-Jones-Lee-Pender-Sampson and Cleveland-Gaston-Lincoln clusters because his 0-district results for these clusters are based on a small number of maps.

I hereby certify that the foregoing statements are true and correct to the best of my knowledge, information, and belief.

Wesley Pegden
12/28/2021

PEGDEN 5

NC General Assembly

Population Deviation Report

District Plan: SL 2021-175 House

District	Seats	Ideal Pop	Actual Pop	Deviation	Deviation %
1	1	86,995	84,330	-2,665	-3.06%
2	1	86,995	90,793	3,798	4.37%
3	1	86,995	85,099	-1,896	-2.18%
4	1	86,995	83,095	-3,900	-4.48%
5	1	86,995	82,953	-4,042	-4.65%
6	1	86,995	87,332	337	0.39%
7	1	86,995	83,510	-3,485	-4.01%
8	1	86,995	85,793	-1,202	-1.38%
9	1	86,995	84,450	-2,545	-2.93%
10	1	86,995	82,953	-4,042	-4.65%
11	1	86,995	86,298	-697	-0.80%
12	1	86,995	84,745	-2,250	-2.59%
13	1	86,995	83,307	-3,688	-4.24%
14	1	86,995	86,538	-457	-0.53%
15	1	86,995	87,578	583	0.67%
16	1	86,995	90,663	3,668	4.22%
17	1	86,995	89,763	2,768	3.18%
18	1	86,995	91,245	4,250	4.89%
19	1	86,995	91,041	4,046	4.65%
20	1	86,995	90,346	3,351	3.85%
21	1	86,995	86,179	-816	-0.94%
22	1	86,995	88,642	1,647	1.89%
23	1	86,995	88,865	1,870	2.15%
24	1	86,995	87,220	225	0.26%
25	1	86,995	86,534	-461	-0.53%
26	1	86,995	89,947	2,952	3.39%
27	1	86,995	84,735	-2,260	-2.60%
28	1	86,995	85,389	-1,606	-1.85%
29	1	86,995	91,212	4,217	4.85%
30	1	86,995	91,165	4,170	4.79%
31	1	86,995	90,760	3,765	4.33%
32	1	86,995	88,633	1,638	1.88%
33	1	86,995	83,049	-3,946	-4.54%
34	1	86,995	83,679	-3,316	-3.81%
35	1	86,995	88,374	1,379	1.59%
36	1	86,995	90,166	3,171	3.65%
37	1	86,995	90,867	3,872	4.45%
38	1	86,995	88,226	1,231	1.42%
39	1	86,995	90,164	3,169	3.64%
40	1	86,995	83,175	-3,820	-4.39%
41	1	86,995	89,887	2,892	3.32%
42	1	86,995	85,537	-1,458	-1.68%
43	1	86,995	82,956	-4,039	-4.64%
44	1	86,995	[illegible]	[illegible]	-4.25%

NCLCV v. Hall
21 CVS 15426
LDTX183
JH-12/30/2021

PEGDEN 5

NC General Assembly

Population Deviation Report

District Plan: SL 2021-175 House

District	Seats	Ideal Pop	Actual Pop	Deviation	Deviation %
45	1	86,995	82,938	-4,057	-4.66%
46	1	86,995	83,445	-3,550	-4.08%
47	1	86,995	83,708	-3,287	-3.78%
48	1	86,995	86,256	-739	-0.85%
49	1	86,995	86,157	-838	-0.96%
50	1	86,995	85,345	-1,650	-1.90%
51	1	86,995	83,073	-3,922	-4.51%
52	1	86,995	84,383	-2,612	-3.00%
53	1	86,995	86,899	-96	-0.11%
54	1	86,995	83,475	-3,520	-4.05%
55	1	86,995	87,005	10	0.01%
56	1	86,995	86,087	-908	-1.04%
57	1	86,995	90,615	3,620	4.16%
58	1	86,995	90,808	3,813	4.38%
59	1	86,995	90,361	3,366	3.87%
60	1	86,995	89,735	2,740	3.15%
61	1	86,995	90,201	3,206	3.69%
62	1	86,995	89,579	2,584	2.97%
63	1	86,995	86,399	-596	-0.69%
64	1	86,995	85,016	-1,979	-2.27%
65	1	86,995	91,096	4,101	4.71%
66	1	86,995	83,189	-3,806	-4.37%
67	1	86,995	88,255	1,260	1.45%
68	1	86,995	88,138	1,143	1.31%
69	1	86,995	85,179	-1,816	-2.09%
70	1	86,995	89,118	2,123	2.44%
71	1	86,995	84,874	-2,121	-2.44%
72	1	86,995	86,949	-46	-0.05%
73	1	86,995	90,649	3,654	4.20%
74	1	86,995	84,857	-2,138	-2.46%
75	1	86,995	84,220	-2,775	-3.19%
76	1	86,995	89,815	2,820	3.24%
77	1	86,995	90,628	3,633	4.18%
78	1	86,995	86,365	-630	-0.72%
79	1	86,995	83,163	-3,832	-4.40%
80	1	86,995	84,864	-2,131	-2.45%
81	1	86,995	84,066	-2,929	-3.37%
82	1	86,995	90,771	3,776	4.34%
83	1	86,995	90,742	3,747	4.31%
84	1	86,995	86,773	-222	-0.26%
85	1	86,995	90,863	3,868	4.45%
86	1	86,995	87,570	575	0.66%
87	1	86,995	85,758	-1,237	-1.42%
88	1	86,995	82,834	-4,161	-4.78%

PEGDEN 5

NC General Assembly

Population Deviation Report

District Plan: SL 2021-175 House

District	Seats	Ideal Pop	Actual Pop	Deviation	Deviation %
89	1	86,995	85,577	-1,418	-1.63%
90	1	86,995	82,937	-4,058	-4.66%
91	1	86,995	86,210	-785	-0.90%
92	1	86,995	85,031	-1,964	-2.26%
93	1	86,995	86,445	-550	-0.63%
94	1	86,995	90,835	3,840	4.41%
95	1	86,995	85,366	-1,629	-1.87%
96	1	86,995	89,587	2,592	2.98%
97	1	86,995	86,810	-185	-0.21%
98	1	86,995	86,827	-168	-0.19%
99	1	86,995	87,647	652	0.75%
100	1	86,995	87,197	202	0.23%
101	1	86,995	86,426	-569	-0.65%
102	1	86,995	86,179	-816	-0.94%
103	1	86,995	87,132	137	0.16%
104	1	86,995	86,520	-475	-0.55%
105	1	86,995	85,822	-1,173	-1.35%
106	1	86,995	82,824	-4,171	-4.79%
107	1	86,995	88,237	1,242	1.43%
108	1	86,995	86,263	-732	-0.84%
109	1	86,995	87,762	767	0.88%
110	1	86,995	88,397	1,402	1.61%
111	1	86,995	89,894	2,899	3.33%
112	1	86,995	82,806	-4,189	-4.82%
113	1	86,995	89,058	2,063	2.37%
114	1	86,995	89,685	2,690	3.09%
115	1	86,995	90,262	3,267	3.76%
116	1	86,995	89,505	2,510	2.89%
117	1	86,995	91,035	4,040	4.64%
118	1	86,995	83,282	-3,713	-4.27%
119	1	86,995	90,212	3,217	3.70%
120	1	86,995	84,907	-2,088	-2.40%
Totals:	**120**		**10,439,388**		

PEGDEN 5

NC General Assembly

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Alamance	63	171,415	86,399	86,399	50.40 %	100.00 %
	64	171,415	85,016	85,016	49.60 %	100.00 %
Alexander	94	36,444	90,835	36,444	100.00 %	40.12 %
Alleghany	93	10,888	86,445	10,888	100.00 %	12.60 %
Anson	55	22,055	87,005	22,055	100.00 %	25.35 %
Ashe	93	26,577	86,445	26,577	100.00 %	30.74 %
Avery	85	17,806	90,863	17,806	100.00 %	19.60 %
Beaufort	79	44,652	83,163	44,652	100.00 %	53.69 %
Bertie	23	17,934	88,865	17,934	100.00 %	20.18 %
Bladen	22	29,606	88,642	29,606	100.00 %	33.40 %
Brunswick	17	136,693	89,763	89,763	65.67 %	100.00 %
	19	136,693	91,041	46,930	34.33 %	51.55 %
Buncombe	114	269,452	89,685	89,685	33.28 %	100.00 %
	115	269,452	90,262	90,262	33.50 %	100.00 %
	116	269,452	89,505	89,505	33.22 %	100.00 %
Burke	86	87,570	87,570	87,570	100.00 %	100.00 %
Cabarrus	73	225,804	90,649	90,649	40.14 %	100.00 %
	82	225,804	90,771	90,771	40.20 %	100.00 %
	83	225,804	90,742	44,384	19.66 %	48.91 %
Caldwell	87	80,652	85,758	80,652	100.00 %	94.05 %
Camden	5	10,355	82,953	10,355	100.00 %	12.48 %
Carteret	13	67,686	83,307	67,686	100.00 %	81.25 %
Caswell	50	22,736	85,345	22,736	100.00 %	26.64 %
Catawba	89	160,610	85,577	71,023	44.22 %	82.99 %
	96	160,610	89,587	89,587	55.78 %	100.00 %
Chatham	54	76,285	83,475	76,285	100.00 %	91.39 %
Cherokee	120	28,774	84,907	28,774	100.00 %	33.89 %
Chowan	1	13,708	84,330	13,708	100.00 %	16.26 %
Clay	120	11,089	84,907	11,089	100.00 %	13.06 %
Cleveland	110	99,519	88,397	34,479	34.65 %	39.00 %
	111	99,519	89,894	65,040	65.35 %	72.35 %
Columbus	46	50,623	83,445	50,623	100.00 %	60.67 %
Craven	3	100,720	85,099	85,099	84.49 %	100.00 %
	13	100,720	83,307	15,621	15.51 %	18.75 %
Cumberland	42	334,728	85,537	85,537	25.55 %	100.00 %
	43	334,728	82,956	82,956	24.78 %	100.00 %
	44	334,728	83,297	83,297	24.88 %	100.00 %
	45	334,728	82,938	82,938	24.78 %	100.00 %
Currituck	1	28,100	84,330	28,100	100.00 %	33.32 %
Dare	1	36,915	84,330	15,269	41.36 %	18.11 %
	79	36,915	83,163	21,646	58.64 %	26.03 %

PEGDEN 5

NC General Assembly

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Davidson	80	168,930	84,864	84,864	50.24 %	100.00 %
	81	168,930	84,066	84,066	49.76 %	100.00 %
Davie	77	42,712	90,628	42,712	100.00 %	47.13 %
Duplin	4	48,715	83,095	48,715	100.00 %	58.63 %
Durham	2	324,833	90,793	51,696	15.91 %	56.94 %
	29	324,833	91,212	91,212	28.08 %	100.00 %
	30	324,833	91,165	91,165	28.07 %	100.00 %
	31	324,833	90,760	90,760	27.94 %	100.00 %
Edgecombe	23	48,900	88,865	48,900	100.00 %	55.03 %
Forsyth	71	382,590	84,874	84,874	22.18 %	100.00 %
	72	382,590	86,949	86,949	22.73 %	100.00 %
	74	382,590	84,857	84,857	22.18 %	100.00 %
	75	382,590	84,220	84,220	22.01 %	100.00 %
	91	382,590	86,210	41,690	10.90 %	48.36 %
Franklin	7	68,573	83,510	68,573	100.00 %	82.11 %
Gaston	108	227,943	86,263	86,263	37.84 %	100.00 %
	109	227,943	87,762	87,762	38.50 %	100.00 %
	110	227,943	88,397	53,918	23.65 %	61.00 %
Gates	5	10,478	82,953	10,478	100.00 %	12.63 %
Graham	120	8,030	84,907	8,030	100.00 %	9.46 %
Granville	7	60,992	83,510	14,937	24.49 %	17.89 %
	32	60,992	88,633	46,055	75.51 %	51.96 %
Greene	12	20,451	84,745	20,451	100.00 %	24.13 %
Guilford	57	541,299	90,615	90,615	16.74 %	100.00 %
	58	541,299	90,808	90,808	16.78 %	100.00 %
	59	541,299	90,361	90,361	16.69 %	100.00 %
	60	541,299	89,735	89,735	16.58 %	100.00 %
	61	541,299	90,201	90,201	16.66 %	100.00 %
	62	541,299	89,579	89,579	16.55 %	100.00 %
Halifax	27	48,622	84,735	48,622	100.00 %	57.38 %
Harnett	6	133,568	87,332	87,332	65.38 %	100.00 %
	53	133,568	86,899	46,236	34.62 %	53.21 %
Haywood	118	62,089	83,282	62,089	100.00 %	74.55 %
Henderson	113	116,281	89,058	25,246	21.71 %	28.35 %
	117	116,281	91,035	91,035	78.29 %	100.00 %
Hertford	5	21,552	82,953	21,552	100.00 %	25.98 %
Hoke	48	52,082	86,256	52,082	100.00 %	60.38 %
Hyde	79	4,589	83,163	4,589	100.00 %	5.52 %
Iredell	84	186,693	86,773	86,773	46.48 %	100.00 %
	89	186,693	85,577	14,554	7.80 %	17.01 %
	95	186,693	85,366	85,366	45.73 %	100.00 %
Jackson	119	43,109	90,212	43,109	100.00 %	47.79 %

PEGDEN 5

NC General Assembly

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Johnston	26	215,999	89,947	89,947	41.64 %	100.00 %
	28	215,999	85,389	85,389	39.53 %	100.00 %
	53	215,999	86,899	40,663	18.83 %	46.79 %
Jones	12	9,172	84,745	9,172	100.00 %	10.82 %
Lee	51	63,285	83,073	63,285	100.00 %	76.18 %
Lenoir	12	55,122	84,745	55,122	100.00 %	65.04 %
Lincoln	97	86,810	86,810	86,810	100.00 %	100.00 %
Macon	120	37,014	84,907	37,014	100.00 %	43.59 %
Madison	118	21,193	83,282	21,193	100.00 %	25.45 %
Martin	23	22,031	88,865	22,031	100.00 %	24.79 %
McDowell	85	44,578	90,863	39,684	89.02 %	43.67 %
	113	44,578	89,058	4,894	10.98 %	5.50 %
Mecklenburg	88	1,115,482	82,834	82,834	7.43 %	100.00 %
	92	1,115,482	85,031	85,031	7.62 %	100.00 %
	98	1,115,482	86,827	86,827	7.78 %	100.00 %
	99	1,115,482	87,647	87,647	7.86 %	100.00 %
	100	1,115,482	87,197	87,197	7.82 %	100.00 %
	101	1,115,482	86,426	86,426	7.75 %	100.00 %
	102	1,115,482	86,179	86,179	7.73 %	100.00 %
	103	1,115,482	87,132	87,132	7.81 %	100.00 %
	104	1,115,482	86,520	86,520	7.76 %	100.00 %
	105	1,115,482	85,822	85,822	7.69 %	100.00 %
	106	1,115,482	82,824	82,824	7.42 %	100.00 %
	107	1,115,482	88,237	88,237	7.91 %	100.00 %
	112	1,115,482	82,806	82,806	7.42 %	100.00 %
Mitchell	85	14,903	90,863	14,903	100.00 %	16.40 %
Montgomery	67	25,751	88,255	25,751	100.00 %	29.18 %
Moore	51	99,727	83,073	19,788	19.84 %	23.82 %
	52	99,727	84,383	41,437	41.55 %	49.11 %
	78	99,727	86,365	38,502	38.61 %	44.58 %
Nash	24	94,970	87,220	8,436	8.88 %	9.67 %
	25	94,970	86,534	86,534	91.12 %	100.00 %
New Hanover	18	225,702	91,245	91,245	40.43 %	100.00 %
	19	225,702	91,041	44,111	19.54 %	48.45 %
	20	225,702	90,346	90,346	40.03 %	100.00 %
Northampton	27	17,471	84,735	17,471	100.00 %	20.62 %
Onslow	14	204,576	86,538	86,538	42.30 %	100.00 %
	15	204,576	87,578	87,578	42.81 %	100.00 %
	16	204,576	90,663	30,460	14.89 %	33.60 %
Orange	50	148,696	85,345	62,609	42.11 %	73.36 %
	56	148,696	86,087	86,087	57.89 %	100.00 %
Pamlico	79	12,276	83,163	12,276	100.00 %	14.76 %

PEGDEN 5

NC General Assembly

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Pasquotank	5	40,568	82,953	40,568	100.00 %	48.90 %
Pender	16	60,203	90,663	60,203	100.00 %	66.40 %
Perquimans	1	13,005	84,330	13,005	100.00 %	15.42 %
Person	2	39,097	90,793	39,097	100.00 %	43.06 %
Pitt	8	170,243	85,793	85,793	50.39 %	100.00 %
	9	170,243	84,450	84,450	49.61 %	100.00 %
Polk	113	19,328	89,058	19,328	100.00 %	21.70 %
Randolph	54	144,171	83,475	7,190	4.99 %	8.61 %
	70	144,171	89,118	89,118	61.81 %	100.00 %
	78	144,171	86,365	47,863	33.20 %	55.42 %
Richmond	52	42,946	84,383	42,946	100.00 %	50.89 %
Robeson	46	116,530	83,445	32,822	28.17 %	39.33 %
	47	116,530	83,708	83,708	71.83 %	100.00 %
Rockingham	65	91,096	91,096	91,096	100.00 %	100.00 %
Rowan	76	146,875	89,815	89,815	61.15 %	100.00 %
	77	146,875	90,628	10,702	7.29 %	11.81 %
	83	146,875	90,742	46,358	31.56 %	51.09 %
Rutherford	111	64,444	89,894	24,854	38.57 %	27.65 %
	113	64,444	89,058	39,590	61.43 %	44.45 %
Sampson	22	59,036	88,642	59,036	100.00 %	66.60 %
Scotland	48	34,174	86,256	34,174	100.00 %	39.62 %
Stanly	67	62,504	88,255	62,504	100.00 %	70.82 %
Stokes	91	44,520	86,210	44,520	100.00 %	51.64 %
Surry	90	71,359	82,937	71,359	100.00 %	86.04 %
Swain	119	14,117	90,212	14,117	100.00 %	15.65 %
Transylvania	119	32,986	90,212	32,986	100.00 %	36.56 %
Tyrrell	1	3,245	84,330	3,245	100.00 %	3.85 %
Union	55	238,267	87,005	64,950	27.26 %	74.65 %
	68	238,267	88,138	88,138	36.99 %	100.00 %
	69	238,267	85,179	85,179	35.75 %	100.00 %
Vance	32	42,578	88,633	42,578	100.00 %	48.04 %

PEGDEN 5

NC General Assembly

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Wake	11	1,129,410	86,298	86,298	7.64 %	100.00 %
	21	1,129,410	86,179	86,179	7.63 %	100.00 %
	33	1,129,410	83,049	83,049	7.35 %	100.00 %
	34	1,129,410	83,679	83,679	7.41 %	100.00 %
	35	1,129,410	88,374	88,374	7.82 %	100.00 %
	36	1,129,410	90,166	90,166	7.98 %	100.00 %
	37	1,129,410	90,867	90,867	8.05 %	100.00 %
	38	1,129,410	88,226	88,226	7.81 %	100.00 %
	39	1,129,410	90,164	90,164	7.98 %	100.00 %
	40	1,129,410	83,175	83,175	7.36 %	100.00 %
	41	1,129,410	89,887	89,887	7.96 %	100.00 %
	49	1,129,410	86,157	86,157	7.63 %	100.00 %
	66	1,129,410	83,189	83,189	7.37 %	100.00 %
Warren	27	18,642	84,735	18,642	100.00 %	22.00 %
Washington	1	11,003	84,330	11,003	100.00 %	13.05 %
Watauga	87	54,086	85,758	5,106	9.44 %	5.95 %
	93	54,086	86,445	48,980	90.56 %	56.66 %
Wayne	4	117,333	83,095	34,380	29.30 %	41.37 %
	10	117,333	82,953	82,953	70.70 %	100.00 %
Wilkes	90	65,969	82,937	11,578	17.55 %	13.96 %
	94	65,969	90,835	54,391	82.45 %	59.88 %
Wilson	24	78,784	87,220	78,784	100.00 %	90.33 %
Yadkin	77	37,214	90,628	37,214	100.00 %	41.06 %
Yancey	85	18,470	90,863	18,470	100.00 %	20.33 %
			Total:	**10,439,388**		

Number of split counties: 36
Display: all counties

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Data Source: 2020 Census Redistricting Data (Public Law 94-171) Summary File - North Carolina
Printed 11/4/2021 [G20-CntyDist]

PEGDEN 5

NC General Assembly

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
1	Chowan	84,330	13,708	13,708	16.26 %	100.00 %
	Currituck	84,330	28,100	28,100	33.32 %	100.00 %
	Dare	84,330	36,915	15,269	18.11 %	41.36 %
	Perquimans	84,330	13,005	13,005	15.42 %	100.00 %
	Tyrrell	84,330	3,245	3,245	3.85 %	100.00 %
	Washington	84,330	11,003	11,003	13.05 %	100.00 %
2	Durham	90,793	324,833	51,696	56.94 %	15.91 %
	Person	90,793	39,097	39,097	43.06 %	100.00 %
3	Craven	85,099	100,720	85,099	100.00 %	84.49 %
4	Duplin	83,095	48,715	48,715	58.63 %	100.00 %
	Wayne	83,095	117,333	34,380	41.37 %	29.30 %
5	Camden	82,953	10,355	10,355	12.48 %	100.00 %
	Gates	82,953	10,478	10,478	12.63 %	100.00 %
	Hertford	82,953	21,552	21,552	25.98 %	100.00 %
	Pasquotank	82,953	40,568	40,568	48.90 %	100.00 %
6	Harnett	87,332	133,568	87,332	100.00 %	65.38 %
7	Franklin	83,510	68,573	68,573	82.11 %	100.00 %
	Granville	83,510	60,992	14,937	17.89 %	24.49 %
8	Pitt	85,793	170,243	85,793	100.00 %	50.39 %
9	Pitt	84,450	170,243	84,450	100.00 %	49.61 %
10	Wayne	82,953	117,333	82,953	100.00 %	70.70 %
11	Wake	86,298	1,129,410	86,298	100.00 %	7.64 %
12	Greene	84,745	20,451	20,451	24.13 %	100.00 %
	Jones	84,745	9,172	9,172	10.82 %	100.00 %
	Lenoir	84,745	55,122	55,122	65.04 %	100.00 %
13	Carteret	83,307	67,686	67,686	81.25 %	100.00 %
	Craven	83,307	100,720	15,621	18.75 %	15.51 %
14	Onslow	86,538	204,576	86,538	100.00 %	42.30 %
15	Onslow	87,578	204,576	87,578	100.00 %	42.81 %
16	Onslow	90,663	204,576	30,460	33.60 %	14.89 %
	Pender	90,663	60,203	60,203	66.40 %	100.00 %
17	Brunswick	89,763	136,693	89,763	100.00 %	65.67 %
18	New Hanover	91,245	225,702	91,245	100.00 %	40.43 %
19	Brunswick	91,041	136,693	46,930	51.55 %	34.33 %
	New Hanover	91,041	225,702	44,111	48.45 %	19.54 %
20	New Hanover	90,346	225,702	90,346	100.00 %	40.03 %
21	Wake	86,179	1,129,410	86,179	100.00 %	7.63 %
22	Bladen	88,642	29,606	29,606	33.40 %	100.00 %
	Sampson	88,642	59,036	59,036	66.60 %	100.00 %
23	Bertie	88,865	17,934	17,934	20.18 %	100.00 %
	Edgecombe	88,865	48,900	48,900	55.03 %	100.00 %
	Martin	88,865	22,031	22,031	24.79 %	100.00 %

PEGDEN 5

NC General Assembly

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
24	Nash	87,220	94,970	8,436	9.67 %	8.88 %
	Wilson	87,220	78,784	78,784	90.33 %	100.00 %
25	Nash	86,534	94,970	86,534	100.00 %	91.12 %
26	Johnston	89,947	215,999	89,947	100.00 %	41.64 %
27	Halifax	84,735	48,622	48,622	57.38 %	100.00 %
	Northampton	84,735	17,471	17,471	20.62 %	100.00 %
	Warren	84,735	18,642	18,642	22.00 %	100.00 %
28	Johnston	85,389	215,999	85,389	100.00 %	39.53 %
29	Durham	91,212	324,833	91,212	100.00 %	28.08 %
30	Durham	91,165	324,833	91,165	100.00 %	28.07 %
31	Durham	90,760	324,833	90,760	100.00 %	27.94 %
32	Granville	88,633	60,992	46,055	51.96 %	75.51 %
	Vance	88,633	42,578	42,578	48.04 %	100.00 %
33	Wake	83,049	1,129,410	83,049	100.00 %	7.35 %
34	Wake	83,679	1,129,410	83,679	100.00 %	7.41 %
35	Wake	88,374	1,129,410	88,374	100.00 %	7.82 %
36	Wake	90,166	1,129,410	90,166	100.00 %	7.98 %
37	Wake	90,867	1,129,410	90,867	100.00 %	8.05 %
38	Wake	88,226	1,129,410	88,226	100.00 %	7.81 %
39	Wake	90,164	1,129,410	90,164	100.00 %	7.98 %
40	Wake	83,175	1,129,410	83,175	100.00 %	7.36 %
41	Wake	89,887	1,129,410	89,887	100.00 %	7.96 %
42	Cumberland	85,537	334,728	85,537	100.00 %	25.55 %
43	Cumberland	82,956	334,728	82,956	100.00 %	24.78 %
44	Cumberland	83,297	334,728	83,297	100.00 %	24.88 %
45	Cumberland	82,938	334,728	82,938	100.00 %	24.78 %
46	Columbus	83,445	50,623	50,623	60.67 %	100.00 %
	Robeson	83,445	116,530	32,822	39.33 %	28.17 %
47	Robeson	83,708	116,530	83,708	100.00 %	71.83 %
48	Hoke	86,256	52,082	52,082	60.38 %	100.00 %
	Scotland	86,256	34,174	34,174	39.62 %	100.00 %
49	Wake	86,157	1,129,410	86,157	100.00 %	7.63 %
50	Caswell	85,345	22,736	22,736	26.64 %	100.00 %
	Orange	85,345	148,696	62,609	73.36 %	42.11 %
51	Lee	83,073	63,285	63,285	76.18 %	100.00 %
	Moore	83,073	99,727	19,788	23.82 %	19.84 %
52	Moore	84,383	99,727	41,437	49.11 %	41.55 %
	Richmond	84,383	42,946	42,946	50.89 %	100.00 %
53	Harnett	86,899	133,568	46,236	53.21 %	34.62 %
	Johnston	86,899	215,999	40,663	46.79 %	18.83 %
54	Chatham	83,475	76,285	76,285	91.39 %	100.00 %
	Randolph	83,475	144,171	7,190	8.61 %	4.99 %

PEGDEN 5

NC General Assembly

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
55	Anson	87,005	22,055	22,055	25.35 %	100.00 %
	Union	87,005	238,267	64,950	74.65 %	27.26 %
56	Orange	86,087	148,696	86,087	100.00 %	57.89 %
57	Guilford	90,615	541,299	90,615	100.00 %	16.74 %
58	Guilford	90,808	541,299	90,808	100.00 %	16.78 %
59	Guilford	90,361	541,299	90,361	100.00 %	16.69 %
60	Guilford	89,735	541,299	89,735	100.00 %	16.58 %
61	Guilford	90,201	541,299	90,201	100.00 %	16.66 %
62	Guilford	89,579	541,299	89,579	100.00 %	16.55 %
63	Alamance	86,399	171,415	86,399	100.00 %	50.40 %
64	Alamance	85,016	171,415	85,016	100.00 %	49.60 %
65	Rockingham	91,096	91,096	91,096	100.00 %	100.00 %
66	Wake	83,189	1,129,410	83,189	100.00 %	7.37 %
67	Montgomery	88,255	25,751	25,751	29.18 %	100.00 %
	Stanly	88,255	62,504	62,504	70.82 %	100.00 %
68	Union	88,138	238,267	88,138	100.00 %	36.99 %
69	Union	85,179	238,267	85,179	100.00 %	35.75 %
70	Randolph	89,118	144,171	89,118	100.00 %	61.81 %
71	Forsyth	84,874	382,590	84,874	100.00 %	22.18 %
72	Forsyth	86,949	382,590	86,949	100.00 %	22.73 %
73	Cabarrus	90,649	225,804	90,649	100.00 %	40.14 %
74	Forsyth	84,857	382,590	84,857	100.00 %	22.18 %
75	Forsyth	84,220	382,590	84,220	100.00 %	22.01 %
76	Rowan	89,815	146,875	89,815	100.00 %	61.15 %
77	Davie	90,628	42,712	42,712	47.13 %	100.00 %
	Rowan	90,628	146,875	10,702	11.81 %	7.29 %
	Yadkin	90,628	37,214	37,214	41.06 %	100.00 %
78	Moore	86,365	99,727	38,502	44.58 %	38.61 %
	Randolph	86,365	144,171	47,863	55.42 %	33.20 %
79	Beaufort	83,163	44,652	44,652	53.69 %	100.00 %
	Dare	83,163	36,915	21,646	26.03 %	58.64 %
	Hyde	83,163	4,589	4,589	5.52 %	100.00 %
	Pamlico	83,163	12,276	12,276	14.76 %	100.00 %
80	Davidson	84,864	168,930	84,864	100.00 %	50.24 %
81	Davidson	84,066	168,930	84,066	100.00 %	49.76 %
82	Cabarrus	90,771	225,804	90,771	100.00 %	40.20 %
83	Cabarrus	90,742	225,804	44,384	48.91 %	19.66 %
	Rowan	90,742	146,875	46,358	51.09 %	31.56 %
84	Iredell	86,773	186,693	86,773	100.00 %	46.48 %

PEGDEN 5

NC General Assembly

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
85	Avery	90,863	17,806	17,806	19.60 %	100.00 %
	McDowell	90,863	44,578	39,684	43.67 %	89.02 %
	Mitchell	90,863	14,903	14,903	16.40 %	100.00 %
	Yancey	90,863	18,470	18,470	20.33 %	100.00 %
86	Burke	87,570	87,570	87,570	100.00 %	100.00 %
87	Caldwell	85,758	80,652	80,652	94.05 %	100.00 %
	Watauga	85,758	54,086	5,106	5.95 %	9.44 %
88	Mecklenburg	82,834	1,115,482	82,834	100.00 %	7.43 %
89	Catawba	85,577	160,610	71,023	82.99 %	44.22 %
	Iredell	85,577	186,693	14,554	17.01 %	7.80 %
90	Surry	82,937	71,359	71,359	86.04 %	100.00 %
	Wilkes	82,937	65,969	11,578	13.96 %	17.55 %
91	Forsyth	86,210	382,590	41,690	48.36 %	10.90 %
	Stokes	86,210	44,520	44,520	51.64 %	100.00 %
92	Mecklenburg	85,031	1,115,482	85,031	100.00 %	7.62 %
93	Alleghany	86,445	10,888	10,888	12.60 %	100.00 %
	Ashe	86,445	26,577	26,577	30.74 %	100.00 %
	Watauga	86,445	54,086	48,980	56.66 %	90.56 %
94	Alexander	90,835	36,444	36,444	40.12 %	100.00 %
	Wilkes	90,835	65,969	54,391	59.88 %	82.45 %
95	Iredell	85,366	186,693	85,366	100.00 %	45.73 %
96	Catawba	89,587	160,610	89,587	100.00 %	55.78 %
97	Lincoln	86,810	86,810	86,810	100.00 %	100.00 %
98	Mecklenburg	86,827	1,115,482	86,827	100.00 %	7.78 %
99	Mecklenburg	87,647	1,115,482	87,647	100.00 %	7.86 %
100	Mecklenburg	87,197	1,115,482	87,197	100.00 %	7.82 %
101	Mecklenburg	86,426	1,115,482	86,426	100.00 %	7.75 %
102	Mecklenburg	86,179	1,115,482	86,179	100.00 %	7.73 %
103	Mecklenburg	87,132	1,115,482	87,132	100.00 %	7.81 %
104	Mecklenburg	86,520	1,115,482	86,520	100.00 %	7.76 %
105	Mecklenburg	85,822	1,115,482	85,822	100.00 %	7.69 %
106	Mecklenburg	82,824	1,115,482	82,824	100.00 %	7.42 %
107	Mecklenburg	88,237	1,115,482	88,237	100.00 %	7.91 %
108	Gaston	86,263	227,943	86,263	100.00 %	37.84 %
109	Gaston	87,762	227,943	87,762	100.00 %	38.50 %
110	Cleveland	88,397	99,519	34,479	39.00 %	34.65 %
	Gaston	88,397	227,943	53,918	61.00 %	23.65 %
111	Cleveland	89,894	99,519	65,040	72.35 %	65.35 %
	Rutherford	89,894	64,444	24,854	27.65 %	38.57 %
112	Mecklenburg	82,806	1,115,482	82,806	100.00 %	7.42 %

PEGDEN 5

NC General Assembly

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
113	Henderson	89,058	116,281	25,246	28.35 %	21.71 %
	McDowell	89,058	44,578	4,894	5.50 %	10.98 %
	Polk	89,058	19,328	19,328	21.70 %	100.00 %
	Rutherford	89,058	64,444	39,590	44.45 %	61.43 %
114	Buncombe	89,685	269,452	89,685	100.00 %	33.28 %
115	Buncombe	90,262	269,452	90,262	100.00 %	33.50 %
116	Buncombe	89,505	269,452	89,505	100.00 %	33.22 %
117	Henderson	91,035	116,281	91,035	100.00 %	78.29 %
118	Haywood	83,282	62,089	62,089	74.55 %	100.00 %
	Madison	83,282	21,193	21,193	25.45 %	100.00 %
119	Jackson	90,212	43,109	43,109	47.79 %	100.00 %
	Swain	90,212	14,117	14,117	15.65 %	100.00 %
	Transylvania	90,212	32,986	32,986	36.56 %	100.00 %
120	Cherokee	84,907	28,774	28,774	33.89 %	100.00 %
	Clay	84,907	11,089	11,089	13.06 %	100.00 %
	Graham	84,907	8,030	8,030	9.46 %	100.00 %
	Macon	84,907	37,014	37,014	43.59 %	100.00 %
			Total:	**10,439,388**		

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Data Source: 2020 Census Redistricting Data (Public Law 94-171) Summary File - North Carolina
[G20-DistCnty] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Aberdeen	52	8,516	84,383	8,516	100.00 %	10.09 %
	78	8,516	86,365	0	0.00 %	0.00 %
Ahoskie	5	4,891	82,953	4,891	100.00 %	5.90 %
Alamance	64	988	85,016	988	100.00 %	1.16 %
Albemarle	67	16,432	88,255	16,432	100.00 %	18.62 %
Alliance	79	733	83,163	733	100.00 %	0.88 %
Andrews	120	1,667	84,907	1,667	100.00 %	1.96 %
Angier	6	5,265	87,332	4,709	89.44 %	5.39 %
	37	5,265	90,867	556	10.56 %	0.61 %
Ansonville	55	440	87,005	440	100.00 %	0.51 %
Apex	11	58,780	86,298	0	0.00 %	0.00 %
	21	58,780	86,179	556	0.95 %	0.65 %
	36	58,780	90,166	57,843	98.41 %	64.15 %
	41	58,780	89,887	381	0.65 %	0.42 %
Arapahoe	79	416	83,163	416	100.00 %	0.50 %
Archdale	60	11,907	89,735	380	3.19 %	0.42 %
	70	11,907	89,118	11,527	96.81 %	12.93 %
Archer Lodge	26	4,797	89,947	4,797	100.00 %	5.33 %
Asheboro	70	27,156	89,118	25,890	95.34 %	29.05 %
	78	27,156	86,365	1,266	4.66 %	1.47 %
Asheville	114	94,589	89,685	52,596	55.60 %	58.65 %
	115	94,589	90,262	29,236	30.91 %	32.39 %
	116	94,589	89,505	12,757	13.49 %	14.25 %
Askewville	23	184	88,865	184	100.00 %	0.21 %
Atkinson	16	296	90,663	296	100.00 %	0.33 %
Atlantic Beach	13	1,364	83,307	1,364	100.00 %	1.64 %
Aulander	23	763	88,865	763	100.00 %	0.86 %
Aurora	79	455	83,163	455	100.00 %	0.55 %
Autryville	22	167	88,642	167	100.00 %	0.19 %
Ayden	9	4,977	84,450	4,977	100.00 %	5.89 %
Badin	67	2,024	88,255	2,024	100.00 %	2.29 %
Bailey	24	568	87,220	568	100.00 %	0.65 %
Bakersville	85	450	90,863	450	100.00 %	0.50 %
Bald Head Island	19	268	91,041	268	100.00 %	0.29 %
Banner Elk	85	1,049	90,863	1,049	100.00 %	1.15 %
Bath	79	245	83,163	245	100.00 %	0.29 %
Bayboro	79	1,161	83,163	1,161	100.00 %	1.40 %
Bear Grass	23	89	88,865	89	100.00 %	0.10 %
Beaufort	13	4,464	83,307	4,464	100.00 %	5.36 %
Beech Mountain	85	675	90,863	62	9.19 %	0.07 %
	93	675	86,445	613	90.81 %	0.71 %
Belhaven	79	1,410	83,163	1,410	100.00 %	1.70 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM

Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.

[G20-MuniDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Belmont	108	15,010	86,263	1,868	12.45 %	2.17 %
	109	15,010	87,762	13,142	87.55 %	14.97 %
Belville	17	2,406	89,763	2,406	100.00 %	2.68 %
Belwood	110	857	88,397	857	100.00 %	0.97 %
Benson	28	3,967	85,389	3,967	100.00 %	4.65 %
	53	3,967	86,899	0	0.00 %	0.00 %
Bermuda Run	77	3,120	90,628	3,120	100.00 %	3.44 %
Bessemer City	110	5,428	88,397	5,428	100.00 %	6.14 %
Bethania	74	344	84,857	0	0.00 %	0.00 %
	91	344	86,210	344	100.00 %	0.40 %
Bethel	8	1,373	85,793	1,373	100.00 %	1.60 %
Beulaville	4	1,116	83,095	1,116	100.00 %	1.34 %
Biltmore Forest	116	1,409	89,505	1,409	100.00 %	1.57 %
Biscoe	67	1,848	88,255	1,848	100.00 %	2.09 %
Black Creek	24	692	87,220	692	100.00 %	0.79 %
Black Mountain	115	8,426	90,262	8,426	100.00 %	9.34 %
Bladenboro	22	1,648	88,642	1,648	100.00 %	1.86 %
Blowing Rock	87	1,376	85,758	96	6.98 %	0.11 %
	93	1,376	86,445	1,280	93.02 %	1.48 %
Boardman	46	166	83,445	166	100.00 %	0.20 %
Bogue	13	695	83,307	695	100.00 %	0.83 %
Boiling Spring Lakes	19	5,943	91,041	5,943	100.00 %	6.53 %
Boiling Springs	111	4,615	89,894	4,615	100.00 %	5.13 %
Bolivia	19	149	91,041	149	100.00 %	0.16 %
Bolton	46	519	83,445	519	100.00 %	0.62 %
Boone	87	19,092	85,758	595	3.12 %	0.69 %
	93	19,092	86,445	18,497	96.88 %	21.40 %
Boonville	77	1,185	90,628	1,185	100.00 %	1.31 %
Bostic	111	355	89,894	355	100.00 %	0.39 %
Brevard	119	7,744	90,212	7,744	100.00 %	8.58 %
Bridgeton	3	349	85,099	349	100.00 %	0.41 %
Broadway	6	1,267	87,332	0	0.00 %	0.00 %
	51	1,267	83,073	1,267	100.00 %	1.53 %
Brookford	96	442	89,587	442	100.00 %	0.49 %
Brunswick	46	973	83,445	973	100.00 %	1.17 %
Bryson City	119	1,558	90,212	1,558	100.00 %	1.73 %
Bunn	7	327	83,510	327	100.00 %	0.39 %
Burgaw	16	3,088	90,663	3,088	100.00 %	3.41 %
Burlington	59	57,303	90,361	1,822	3.18 %	2.02 %
	63	57,303	86,399	25,917	45.23 %	30.00 %
	64	57,303	85,016	29,564	51.59 %	34.77 %
Burnsville	85	1,614	90,863	1,614	100.00 %	1.78 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
[G20-MuniDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Butner	32	8,397	88,633	8,397	100.00 %	9.47 %
Cajah's Mountain	87	2,722	85,758	2,722	100.00 %	3.17 %
Calabash	17	2,011	89,763	2,011	100.00 %	2.24 %
Calypso	4	327	83,095	327	100.00 %	0.39 %
Cameron	51	244	83,073	244	100.00 %	0.29 %
Candor	67	813	88,255	813	100.00 %	0.92 %
	78	813	86,365	0	0.00 %	0.00 %
Canton	118	4,422	83,282	4,422	100.00 %	5.31 %
Cape Carteret	13	2,224	83,307	2,224	100.00 %	2.67 %
Carolina Beach	19	6,564	91,041	6,564	100.00 %	7.21 %
Carolina Shores	17	4,588	89,763	4,588	100.00 %	5.11 %
Carrboro	50	21,295	85,345	174	0.82 %	0.20 %
	56	21,295	86,087	21,121	99.18 %	24.53 %
Carthage	51	2,775	83,073	2,747	98.99 %	3.31 %
	52	2,775	84,383	28	1.01 %	0.03 %
Cary	11	174,721	86,298	43,537	24.92 %	50.45 %
	21	174,721	86,179	30,622	17.53 %	35.53 %
	36	174,721	90,166	0	0.00 %	0.00 %
	37	174,721	90,867	2,012	1.15 %	2.21 %
	41	174,721	89,887	74,074	42.40 %	82.41 %
	49	174,721	86,157	20,767	11.89 %	24.10 %
	54	174,721	83,475	3,709	2.12 %	4.44 %
Casar	110	305	88,397	305	100.00 %	0.35 %
Castalia	25	264	86,534	264	100.00 %	0.31 %
Caswell Beach	19	395	91,041	395	100.00 %	0.43 %
Catawba	89	702	85,577	702	100.00 %	0.82 %
Cedar Point	13	1,764	83,307	1,764	100.00 %	2.12 %
Cedar Rock	87	301	85,758	301	100.00 %	0.35 %
Cerro Gordo	46	131	83,445	131	100.00 %	0.16 %
Chadbourn	46	1,574	83,445	1,574	100.00 %	1.89 %
Chapel Hill	29	61,960	91,212	2,906	4.69 %	3.19 %
	56	61,960	86,087	59,054	95.31 %	68.60 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Charlotte	88	874,579	82,834	82,834	9.47 %	100.00 %
	92	874,579	85,031	63,762	7.29 %	74.99 %
	99	874,579	87,647	79,113	9.05 %	90.26 %
	100	874,579	87,197	87,197	9.97 %	100.00 %
	101	874,579	86,426	64,526	7.38 %	74.66 %
	102	874,579	86,179	86,179	9.85 %	100.00 %
	103	874,579	87,132	23,590	2.70 %	27.07 %
	104	874,579	86,520	86,520	9.89 %	100.00 %
	105	874,579	85,822	71,156	8.14 %	82.91 %
	106	874,579	82,824	79,717	9.11 %	96.25 %
	107	874,579	88,237	67,298	7.69 %	76.27 %
	112	874,579	82,806	82,687	9.45 %	99.86 %
Cherryville	110	6,078	88,397	6,078	100.00 %	6.88 %
Chimney Rock Village	113	140	89,058	140	100.00 %	0.16 %
China Grove	83	4,434	90,742	4,434	100.00 %	4.89 %
Chocowinity	79	722	83,163	722	100.00 %	0.87 %
Claremont	89	1,692	85,577	1,692	100.00 %	1.98 %
Clarkton	22	614	88,642	614	100.00 %	0.69 %
Clayton	26	26,307	89,947	26,307	100.00 %	29.25 %
	38	26,307	88,226	0	0.00 %	0.00 %
	39	26,307	90,164	0	0.00 %	0.00 %
Clemmons	74	21,163	84,857	21,163	100.00 %	24.94 %
Cleveland	77	846	90,628	846	100.00 %	0.93 %
Clinton	22	8,383	88,642	8,383	100.00 %	9.46 %
Clyde	118	1,368	83,282	1,368	100.00 %	1.64 %
Coats	53	2,155	86,899	2,155	100.00 %	2.48 %
Cofield	5	267	82,953	267	100.00 %	0.32 %
Colerain	23	217	88,865	217	100.00 %	0.24 %
Columbia	1	610	84,330	610	100.00 %	0.72 %
Columbus	113	1,060	89,058	1,060	100.00 %	1.19 %
Como	5	67	82,953	67	100.00 %	0.08 %
Concord	73	105,240	90,649	32,447	30.83 %	35.79 %
	82	105,240	90,771	48,723	46.30 %	53.68 %
	83	105,240	90,742	24,070	22.87 %	26.53 %
Conetoe	23	198	88,865	198	100.00 %	0.22 %
Connelly Springs	86	1,529	87,570	1,529	100.00 %	1.75 %
Conover	89	8,421	85,577	424	5.04 %	0.50 %
	96	8,421	89,587	7,997	94.96 %	8.93 %
Conway	27	752	84,735	752	100.00 %	0.89 %
Cooleemee	77	940	90,628	940	100.00 %	1.04 %
Cornelius	98	31,412	86,827	31,412	100.00 %	36.18 %
Cove City	3	378	85,099	378	100.00 %	0.44 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Cramerton	108	5,296	86,263	96	1.81 %	0.11 %
	109	5,296	87,762	5,200	98.19 %	5.93 %
Creedmoor	7	4,866	83,510	2,065	42.44 %	2.47 %
	32	4,866	88,633	2,801	57.56 %	3.16 %
Creswell	1	207	84,330	207	100.00 %	0.25 %
Crossnore	85	143	90,863	143	100.00 %	0.16 %
Dallas	110	5,927	88,397	5,927	100.00 %	6.70 %
Danbury	91	189	86,210	189	100.00 %	0.22 %
Davidson	95	15,106	85,366	378	2.50 %	0.44 %
	98	15,106	86,827	14,728	97.50 %	16.96 %
Dellview	110	6	88,397	6	100.00 %	0.01 %
Denton	80	1,494	84,864	1,494	100.00 %	1.76 %
Dillsboro	119	213	90,212	213	100.00 %	0.24 %
Dobbins Heights	52	687	84,383	687	100.00 %	0.81 %
Dobson	90	1,462	82,937	1,462	100.00 %	1.76 %
Dortches	25	1,082	86,534	1,082	100.00 %	1.25 %
Dover	3	349	85,099	349	100.00 %	0.41 %
Drexel	86	1,760	87,570	1,760	100.00 %	2.01 %
Dublin	22	267	88,642	267	100.00 %	0.30 %
Duck	1	742	84,330	742	100.00 %	0.88 %
Dunn	53	8,446	86,899	8,446	100.00 %	9.72 %
Durham	2	283,506	90,793	25,167	8.88 %	27.72 %
	29	283,506	91,212	87,035	30.70 %	95.42 %
	30	283,506	91,165	89,671	31.63 %	98.36 %
	31	283,506	90,760	81,220	28.65 %	89.49 %
	40	283,506	83,175	269	0.09 %	0.32 %
	49	283,506	86,157	0	0.00 %	0.00 %
	50	283,506	85,345	144	0.05 %	0.17 %
Earl	111	198	89,894	198	100.00 %	0.22 %
East Arcadia	22	418	88,642	418	100.00 %	0.47 %
East Bend	77	634	90,628	634	100.00 %	0.70 %
East Laurinburg	48	234	86,256	234	100.00 %	0.27 %
Eastover	43	3,656	82,956	3,656	100.00 %	4.41 %
East Spencer	76	1,567	89,815	1,567	100.00 %	1.74 %
Eden	65	15,421	91,096	15,421	100.00 %	16.93 %
Edenton	1	4,460	84,330	4,460	100.00 %	5.29 %
Elizabeth City	5	18,631	82,953	18,631	100.00 %	22.46 %
Elizabethtown	22	3,296	88,642	3,296	100.00 %	3.72 %
Elkin	90	4,122	82,937	4,122	100.00 %	4.97 %
Elk Park	85	542	90,863	542	100.00 %	0.60 %
Ellenboro	111	723	89,894	723	100.00 %	0.80 %
Ellerbe	52	864	84,383	864	100.00 %	1.02 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
[G20-MuniDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Elm City	24	1,218	87,220	1,218	100.00 %	1.40 %
	25	1,218	86,534	0	0.00 %	0.00 %
Elon	64	11,336	85,016	11,336	100.00 %	13.33 %
Emerald Isle	13	3,847	83,307	3,847	100.00 %	4.62 %
Enfield	27	1,865	84,735	1,865	100.00 %	2.20 %
Erwin	53	4,542	86,899	4,542	100.00 %	5.23 %
Eureka	10	214	82,953	214	100.00 %	0.26 %
Everetts	23	150	88,865	150	100.00 %	0.17 %
Fair Bluff	46	709	83,445	709	100.00 %	0.85 %
Fairmont	46	2,191	83,445	2,191	100.00 %	2.63 %
	47	2,191	83,708	0	0.00 %	0.00 %
Fairview	69	3,456	85,179	3,456	100.00 %	4.06 %
Faison	4	784	83,095	784	100.00 %	0.94 %
	22	784	88,642	0	0.00 %	0.00 %
Faith	76	819	89,815	819	100.00 %	0.91 %
Falcon	22	324	88,642	0	0.00 %	0.00 %
	43	324	82,956	324	100.00 %	0.39 %
Falkland	8	47	85,793	47	100.00 %	0.05 %
Fallston	110	627	88,397	627	100.00 %	0.71 %
Farmville	8	4,461	85,793	4,461	100.00 %	5.20 %
Fayetteville	42	208,501	85,537	65,401	31.37 %	76.46 %
	43	208,501	82,956	44,532	21.36 %	53.68 %
	44	208,501	83,297	83,293	39.95 %	100.00 %
	45	208,501	82,938	15,275	7.33 %	18.42 %
Flat Rock	113	3,486	89,058	3,486	100.00 %	3.91 %
Fletcher	117	7,987	91,035	7,987	100.00 %	8.77 %
Fontana Dam	120	13	84,907	13	100.00 %	0.02 %
Forest City	111	7,377	89,894	0	0.00 %	0.00 %
	113	7,377	89,058	7,377	100.00 %	8.28 %
Forest Hills	119	303	90,212	303	100.00 %	0.34 %
Fountain	8	385	85,793	385	100.00 %	0.45 %
Four Oaks	28	2,158	85,389	2,158	100.00 %	2.53 %
Foxfire	52	1,288	84,383	0	0.00 %	0.00 %
	78	1,288	86,365	1,288	100.00 %	1.49 %
Franklin	120	4,175	84,907	4,175	100.00 %	4.92 %
Franklinton	7	2,456	83,510	2,456	100.00 %	2.94 %
Franklinville	78	1,197	86,365	1,197	100.00 %	1.39 %
Fremont	10	1,196	82,953	1,196	100.00 %	1.44 %
Fuquay-Varina	6	34,152	87,332	0	0.00 %	0.00 %
	21	34,152	86,179	30	0.09 %	0.03 %
	36	34,152	90,166	16	0.05 %	0.02 %
	37	34,152	90,867	34,106	99.87 %	37.53 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
[G20-MuniDist] - Generated 11/4/2021

PEGDEN 5

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Gamewell	87	3,702	85,758	3,702	100.00 %	4.32 %
Garland	22	595	88,642	595	100.00 %	0.67 %
Garner	21	31,159	86,179	11,789	37.83 %	13.68 %
	33	31,159	83,049	14	0.04 %	0.02 %
	37	31,159	90,867	0	0.00 %	0.00 %
	38	31,159	88,226	19,356	62.12 %	21.94 %
Garysburg	27	904	84,735	904	100.00 %	1.07 %
Gaston	27	1,008	84,735	1,008	100.00 %	1.19 %
Gastonia	108	80,411	86,263	28,480	35.42 %	33.02 %
	109	80,411	87,762	44,448	55.28 %	50.65 %
	110	80,411	88,397	7,483	9.31 %	8.47 %
Gatesville	5	267	82,953	267	100.00 %	0.32 %
Gibson	48	449	86,256	449	100.00 %	0.52 %
Gibsonville	59	8,920	90,361	4,642	52.04 %	5.14 %
	64	8,920	85,016	4,278	47.96 %	5.03 %
Glen Alpine	86	1,529	87,570	1,529	100.00 %	1.75 %
Godwin	43	128	82,956	128	100.00 %	0.15 %
Goldsboro	4	33,657	83,095	5	0.01 %	0.01 %
	10	33,657	82,953	33,652	99.99 %	40.57 %
Goldston	54	234	83,475	234	100.00 %	0.28 %
Graham	63	17,157	86,399	17,157	100.00 %	19.86 %
Grandfather Village	85	95	90,863	95	100.00 %	0.10 %
Granite Falls	87	4,965	85,758	4,965	100.00 %	5.79 %
Granite Quarry	76	2,984	89,815	2,984	100.00 %	3.32 %
Grantsboro	79	692	83,163	692	100.00 %	0.83 %
Greenevers	4	567	83,095	567	100.00 %	0.68 %
Green Level	63	3,152	86,399	3,152	100.00 %	3.65 %
Greensboro	57	299,035	90,615	83,540	27.94 %	92.19 %
	58	299,035	90,808	84,725	28.33 %	93.30 %
	59	299,035	90,361	13,852	4.63 %	15.33 %
	60	299,035	89,735	8,829	2.95 %	9.84 %
	61	299,035	90,201	90,201	30.16 %	100.00 %
	62	299,035	89,579	17,888	5.98 %	19.97 %
Greenville	8	87,521	85,793	52,881	60.42 %	61.64 %
	9	87,521	84,450	34,640	39.58 %	41.02 %
Grifton	9	2,448	84,450	2,301	94.00 %	2.72 %
	12	2,448	84,745	147	6.00 %	0.17 %
Grimesland	9	386	84,450	386	100.00 %	0.46 %
Grover	111	802	89,894	802	100.00 %	0.89 %
Halifax	27	170	84,735	170	100.00 %	0.20 %
Hamilton	23	306	88,865	306	100.00 %	0.34 %
Hamlet	52	6,025	84,383	6,025	100.00 %	7.14 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Harmony	84	543	86,773	543	100.00 %	0.63 %
Harrells	4	160	83,095	0	0.00 %	0.00 %
	22	160	88,642	160	100.00 %	0.18 %
Harrellsville	5	85	82,953	85	100.00 %	0.10 %
Harrisburg	73	18,967	90,649	18,967	100.00 %	20.92 %
Hassell	23	49	88,865	49	100.00 %	0.06 %
Havelock	3	16,621	85,099	5,986	36.01 %	7.03 %
	13	16,621	83,307	10,635	63.99 %	12.77 %
Haw River	63	2,252	86,399	2,252	100.00 %	2.61 %
Hayesville	120	461	84,907	461	100.00 %	0.54 %
Hemby Bridge	69	1,614	85,179	1,614	100.00 %	1.89 %
Henderson	32	15,060	88,633	15,060	100.00 %	16.99 %
Hendersonville	113	15,137	89,058	623	4.12 %	0.70 %
	117	15,137	91,035	14,514	95.88 %	15.94 %
Hertford	1	1,934	84,330	1,934	100.00 %	2.29 %
Hickory	86	43,490	87,570	79	0.18 %	0.09 %
	87	43,490	85,758	32	0.07 %	0.04 %
	89	43,490	85,577	0	0.00 %	0.00 %
	96	43,490	89,587	43,379	99.74 %	48.42 %
Highlands	119	1,072	90,212	12	1.12 %	0.01 %
	120	1,072	84,907	1,060	98.88 %	1.25 %
High Point	60	114,059	89,735	66,033	57.89 %	73.59 %
	62	114,059	89,579	41,288	36.20 %	46.09 %
	70	114,059	89,118	8	0.01 %	0.01 %
	75	114,059	84,220	84	0.07 %	0.10 %
	80	114,059	84,864	6,646	5.83 %	7.83 %
High Shoals	110	595	88,397	595	100.00 %	0.67 %
Hildebran	86	1,679	87,570	1,679	100.00 %	1.92 %
Hillsborough	50	9,660	85,345	9,660	100.00 %	11.32 %
Hobgood	27	268	84,735	268	100.00 %	0.32 %
Hoffman	52	418	84,383	418	100.00 %	0.50 %
Holden Beach	17	921	89,763	0	0.00 %	0.00 %
	19	921	91,041	921	100.00 %	1.01 %
Holly Ridge	15	4,171	87,578	4,171	100.00 %	4.76 %
Holly Springs	21	41,239	86,179	11,892	28.84 %	13.80 %
	36	41,239	90,166	17,734	43.00 %	19.67 %
	37	41,239	90,867	11,613	28.16 %	12.78 %
Hookerton	12	413	84,745	413	100.00 %	0.49 %
Hope Mills	43	17,808	82,956	64	0.36 %	0.08 %
	45	17,808	82,938	17,744	99.64 %	21.39 %
Hot Springs	118	520	83,282	520	100.00 %	0.62 %
Hudson	87	3,780	85,758	3,780	100.00 %	4.41 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Huntersville	98	61,376	86,827	38,677	63.02 %	44.54 %
	101	61,376	86,426	5,893	9.60 %	6.82 %
	107	61,376	88,237	16,806	27.38 %	19.05 %
Indian Beach	13	223	83,307	223	100.00 %	0.27 %
Indian Trail	55	39,997	87,005	2,376	5.94 %	2.73 %
	68	39,997	88,138	15,036	37.59 %	17.06 %
	69	39,997	85,179	22,585	56.47 %	26.51 %
Jackson	27	430	84,735	430	100.00 %	0.51 %
Jacksonville	14	72,723	86,538	28,456	39.13 %	32.88 %
	15	72,723	87,578	44,267	60.87 %	50.55 %
Jamestown	60	3,668	89,735	3,668	100.00 %	4.09 %
Jamesville	23	424	88,865	424	100.00 %	0.48 %
Jefferson	93	1,622	86,445	1,622	100.00 %	1.88 %
Jonesville	77	2,308	90,628	2,308	100.00 %	2.55 %
Kannapolis	82	53,114	90,771	33,907	63.84 %	37.35 %
	83	53,114	90,742	19,207	36.16 %	21.17 %
Kelford	23	203	88,865	203	100.00 %	0.23 %
Kenansville	4	770	83,095	770	100.00 %	0.93 %
Kenly	24	1,491	87,220	198	13.28 %	0.23 %
	28	1,491	85,389	1,293	86.72 %	1.51 %
Kernersville	62	26,449	89,579	502	1.90 %	0.56 %
	71	26,449	84,874	0	0.00 %	0.00 %
	75	26,449	84,220	25,947	98.10 %	30.81 %
Kill Devil Hills	1	7,656	84,330	7,118	92.97 %	8.44 %
	79	7,656	83,163	538	7.03 %	0.65 %
King	91	7,197	86,210	7,197	100.00 %	8.35 %
Kings Mountain	110	11,142	88,397	1,118	10.03 %	1.26 %
	111	11,142	89,894	10,024	89.97 %	11.15 %
Kingstown	110	656	88,397	656	100.00 %	0.74 %
Kinston	12	19,900	84,745	19,900	100.00 %	23.48 %
Kittrell	32	132	88,633	132	100.00 %	0.15 %
Kitty Hawk	1	3,689	84,330	3,689	100.00 %	4.37 %
Knightdale	38	19,435	88,226	0	0.00 %	0.00 %
	39	19,435	90,164	19,435	100.00 %	21.56 %
Kure Beach	19	2,191	91,041	2,191	100.00 %	2.41 %
La Grange	12	2,595	84,745	2,595	100.00 %	3.06 %
Lake Lure	113	1,365	89,058	1,365	100.00 %	1.53 %
Lake Park	69	3,269	85,179	3,269	100.00 %	3.84 %
Lake Santeetlah	120	38	84,907	38	100.00 %	0.04 %
Lake Waccamaw	46	1,296	83,445	1,296	100.00 %	1.55 %
Landis	83	3,690	90,742	3,690	100.00 %	4.07 %
Lansing	93	126	86,445	126	100.00 %	0.15 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Lasker	27	64	84,735	64	100.00 %	0.08 %
Lattimore	111	406	89,894	406	100.00 %	0.45 %
Laurel Park	113	2,250	89,058	0	0.00 %	0.00 %
	117	2,250	91,035	2,250	100.00 %	2.47 %
Laurinburg	48	14,978	86,256	14,978	100.00 %	17.36 %
Lawndale	110	570	88,397	570	100.00 %	0.64 %
Leggett	23	37	88,865	37	100.00 %	0.04 %
Leland	17	22,908	89,763	22,908	100.00 %	25.52 %
Lenoir	87	18,352	85,758	18,352	100.00 %	21.40 %
Lewiston Woodville	23	426	88,865	426	100.00 %	0.48 %
Lewisville	74	13,381	84,857	13,381	100.00 %	15.77 %
Lexington	80	19,632	84,864	0	0.00 %	0.00 %
	81	19,632	84,066	19,632	100.00 %	23.35 %
Liberty	54	2,655	83,475	2,655	100.00 %	3.18 %
Lilesville	55	395	87,005	395	100.00 %	0.45 %
Lillington	6	4,735	87,332	882	18.63 %	1.01 %
	53	4,735	86,899	3,853	81.37 %	4.43 %
Lincolnton	97	11,091	86,810	11,091	100.00 %	12.78 %
Linden	43	136	82,956	136	100.00 %	0.16 %
Littleton	27	559	84,735	559	100.00 %	0.66 %
Locust	67	4,537	88,255	3,996	88.08 %	4.53 %
	73	4,537	90,649	541	11.92 %	0.60 %
Long View	86	5,088	87,570	735	14.45 %	0.84 %
	96	5,088	89,587	4,353	85.55 %	4.86 %
Louisburg	7	3,064	83,510	3,064	100.00 %	3.67 %
Love Valley	84	154	86,773	154	100.00 %	0.18 %
Lowell	108	3,654	86,263	3,654	100.00 %	4.24 %
	109	3,654	87,762	0	0.00 %	0.00 %
Lucama	24	1,036	87,220	1,036	100.00 %	1.19 %
Lumber Bridge	47	82	83,708	82	100.00 %	0.10 %
Lumberton	46	19,025	83,445	350	1.84 %	0.42 %
	47	19,025	83,708	18,675	98.16 %	22.31 %
McAdenville	108	890	86,263	890	100.00 %	1.03 %
Macclesfield	23	413	88,865	413	100.00 %	0.46 %
McDonald	46	94	83,445	94	100.00 %	0.11 %
McFarlan	55	94	87,005	94	100.00 %	0.11 %
Macon	27	110	84,735	110	100.00 %	0.13 %
Madison	65	2,129	91,096	2,129	100.00 %	2.34 %
Maggie Valley	118	1,687	83,282	1,687	100.00 %	2.03 %
Magnolia	4	831	83,095	831	100.00 %	1.00 %
Maiden	89	3,736	85,577	3,736	100.00 %	4.37 %
	97	3,736	86,810	0	0.00 %	0.00 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Manteo	79	1,600	83,163	1,600	100.00 %	1.92 %
Marietta	46	111	83,445	111	100.00 %	0.13 %
Marion	85	7,717	90,863	7,717	100.00 %	8.49 %
Marshall	118	777	83,282	777	100.00 %	0.93 %
Mars Hill	118	2,007	83,282	2,007	100.00 %	2.41 %
Marshville	55	2,522	87,005	2,522	100.00 %	2.90 %
Marvin	68	6,358	88,138	6,358	100.00 %	7.21 %
Matthews	103	29,435	87,132	29,435	100.00 %	33.78 %
Maxton	46	2,110	83,445	1,902	90.14 %	2.28 %
	48	2,110	86,256	208	9.86 %	0.24 %
Mayodan	65	2,418	91,096	2,418	100.00 %	2.65 %
Maysville	12	818	84,745	818	100.00 %	0.97 %
Mebane	50	17,797	85,345	3,171	17.82 %	3.72 %
	63	17,797	86,399	14,626	82.18 %	16.93 %
Mesic	79	144	83,163	144	100.00 %	0.17 %
Micro	28	458	85,389	458	100.00 %	0.54 %
Middleburg	32	101	88,633	101	100.00 %	0.11 %
Middlesex	24	912	87,220	912	100.00 %	1.05 %
Midland	73	4,684	90,649	4,684	100.00 %	5.17 %
	103	4,684	87,132	0	0.00 %	0.00 %
Midway	80	4,742	84,864	3,469	73.15 %	4.09 %
	81	4,742	84,066	1,273	26.85 %	1.51 %
Mills River	117	7,078	91,035	7,078	100.00 %	7.78 %
Milton	50	155	85,345	155	100.00 %	0.18 %
Mineral Springs	55	3,159	87,005	2,293	72.59 %	2.64 %
	68	3,159	88,138	866	27.41 %	0.98 %
Minnesott Beach	79	530	83,163	530	100.00 %	0.64 %
Mint Hill	69	26,450	85,179	6	0.02 %	0.01 %
	99	26,450	87,647	0	0.00 %	0.00 %
	103	26,450	87,132	26,444	99.98 %	30.35 %
Misenheimer	67	650	88,255	650	100.00 %	0.74 %
Mocksville	77	5,900	90,628	5,900	100.00 %	6.51 %
Momeyer	25	277	86,534	277	100.00 %	0.32 %
Monroe	55	34,562	87,005	12,650	36.60 %	14.54 %
	69	34,562	85,179	21,912	63.40 %	25.72 %
Montreat	115	901	90,262	901	100.00 %	1.00 %
Mooresboro	111	293	89,894	293	100.00 %	0.33 %
Mooresville	84	50,193	86,773	205	0.41 %	0.24 %
	95	50,193	85,366	49,988	99.59 %	58.56 %
Morehead City	13	9,556	83,307	9,556	100.00 %	11.47 %
Morganton	86	17,474	87,570	17,474	100.00 %	19.95 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
[G20-MuniDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Morrisville	11	29,630	86,298	0	0.00 %	0.00 %
	31	29,630	90,760	207	0.70 %	0.23 %
	41	29,630	89,887	14,239	48.06 %	15.84 %
	49	29,630	86,157	15,184	51.25 %	17.62 %
Morven	55	329	87,005	329	100.00 %	0.38 %
Mount Airy	90	10,676	82,937	10,676	100.00 %	12.87 %
Mount Gilead	67	1,171	88,255	1,171	100.00 %	1.33 %
Mount Holly	108	17,703	86,263	17,703	100.00 %	20.52 %
Mount Olive	4	4,198	83,095	4,198	100.00 %	5.05 %
Mount Pleasant	73	1,671	90,649	1,671	100.00 %	1.84 %
Murfreesboro	5	2,619	82,953	2,619	100.00 %	3.16 %
Murphy	120	1,608	84,907	1,608	100.00 %	1.89 %
Nags Head	79	3,168	83,163	3,168	100.00 %	3.81 %
Nashville	25	5,632	86,534	5,632	100.00 %	6.51 %
Navassa	17	1,367	89,763	1,367	100.00 %	1.52 %
New Bern	3	31,291	85,099	31,291	100.00 %	36.77 %
Newland	85	715	90,863	715	100.00 %	0.79 %
New London	67	607	88,255	607	100.00 %	0.69 %
Newport	13	4,364	83,307	4,364	100.00 %	5.24 %
Newton	89	13,148	85,577	13,148	100.00 %	15.36 %
	96	13,148	89,587	0	0.00 %	0.00 %
Newton Grove	22	585	88,642	585	100.00 %	0.66 %
Norlina	27	920	84,735	920	100.00 %	1.09 %
Norman	52	100	84,383	100	100.00 %	0.12 %
North Topsail Beach	15	1,005	87,578	1,005	100.00 %	1.15 %
Northwest	17	703	89,763	703	100.00 %	0.78 %
North Wilkesboro	94	4,382	90,835	4,382	100.00 %	4.82 %
Norwood	67	2,367	88,255	2,367	100.00 %	2.68 %
Oakboro	67	2,128	88,255	2,128	100.00 %	2.41 %
Oak City	23	266	88,865	266	100.00 %	0.30 %
Oak Island	19	8,396	91,041	8,396	100.00 %	9.22 %
Oak Ridge	62	7,474	89,579	7,474	100.00 %	8.34 %
Ocean Isle Beach	17	867	89,763	867	100.00 %	0.97 %
Old Fort	85	811	90,863	811	100.00 %	0.89 %
Oriental	79	880	83,163	880	100.00 %	1.06 %
Orrum	46	59	83,445	59	100.00 %	0.07 %
Ossipee	64	536	85,016	536	100.00 %	0.63 %
Oxford	32	8,628	88,633	8,628	100.00 %	9.73 %
Pantego	79	164	83,163	164	100.00 %	0.20 %
Parkton	47	504	83,708	504	100.00 %	0.60 %
Parmele	23	243	88,865	243	100.00 %	0.27 %
Patterson Springs	111	571	89,894	571	100.00 %	0.64 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Peachland	55	390	87,005	390	100.00 %	0.45 %
Peletier	13	769	83,307	769	100.00 %	0.92 %
Pembroke	47	2,823	83,708	2,823	100.00 %	3.37 %
Pikeville	10	712	82,953	712	100.00 %	0.86 %
Pilot Mountain	90	1,440	82,937	1,440	100.00 %	1.74 %
Pinebluff	52	1,473	84,383	1,473	100.00 %	1.75 %
Pinehurst	52	17,581	84,383	8	0.05 %	0.01 %
	78	17,581	86,365	17,573	99.95 %	20.35 %
Pine Knoll Shores	13	1,388	83,307	1,388	100.00 %	1.67 %
Pine Level	28	2,046	85,389	2,046	100.00 %	2.40 %
Pinetops	23	1,200	88,865	1,200	100.00 %	1.35 %
Pineville	105	10,602	85,822	10,602	100.00 %	12.35 %
	112	10,602	82,806	0	0.00 %	0.00 %
Pink Hill	12	451	84,745	451	100.00 %	0.53 %
Pittsboro	54	4,537	83,475	4,537	100.00 %	5.44 %
Pleasant Garden	59	5,000	90,361	5,000	100.00 %	5.53 %
Plymouth	1	3,320	84,330	3,320	100.00 %	3.94 %
Polkton	55	2,250	87,005	2,250	100.00 %	2.59 %
Polkville	110	516	88,397	516	100.00 %	0.58 %
Pollocksville	12	268	84,745	268	100.00 %	0.32 %
Powellsville	23	189	88,865	189	100.00 %	0.21 %
Princeton	28	1,315	85,389	1,315	100.00 %	1.54 %
Princeville	23	1,254	88,865	1,254	100.00 %	1.41 %
Proctorville	46	121	83,445	121	100.00 %	0.15 %
Raeford	48	4,559	86,256	4,559	100.00 %	5.29 %
Raleigh	2	467,665	90,793	1,326	0.28 %	1.46 %
	11	467,665	86,298	40,792	8.72 %	47.27 %
	21	467,665	86,179	13	0.00 %	0.02 %
	31	467,665	90,760	233	0.05 %	0.26 %
	33	467,665	83,049	82,480	17.64 %	99.31 %
	34	467,665	83,679	83,503	17.86 %	99.79 %
	35	467,665	88,374	6,171	1.32 %	6.98 %
	38	467,665	88,226	56,840	12.15 %	64.43 %
	39	467,665	90,164	13,011	2.78 %	14.43 %
	40	467,665	83,175	57,345	12.26 %	68.94 %
	49	467,665	86,157	47,783	10.22 %	55.46 %
	66	467,665	83,189	78,168	16.71 %	93.96 %
Ramseur	78	1,774	86,365	1,774	100.00 %	2.05 %
Randleman	70	4,595	89,118	4,595	100.00 %	5.16 %
Ranlo	108	4,511	86,263	4,500	99.76 %	5.22 %
	110	4,511	88,397	11	0.24 %	0.01 %
Raynham	46	60	83,445	60	100.00 %	0.07 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Red Cross	67	762	88,255	762	100.00 %	0.86 %
Red Oak	25	3,342	86,534	3,342	100.00 %	3.86 %
Red Springs	47	3,087	83,708	3,087	100.00 %	3.69 %
	48	3,087	86,256	0	0.00 %	0.00 %
Reidsville	65	14,583	91,096	14,583	100.00 %	16.01 %
Rennert	47	275	83,708	275	100.00 %	0.33 %
Rhodhiss	86	997	87,570	639	64.09 %	0.73 %
	87	997	85,758	358	35.91 %	0.42 %
Richfield	67	582	88,255	582	100.00 %	0.66 %
Richlands	16	2,287	90,663	2,287	100.00 %	2.52 %
Rich Square	27	894	84,735	894	100.00 %	1.06 %
River Bend	3	2,902	85,099	2,902	100.00 %	3.41 %
Roanoke Rapids	27	15,229	84,735	15,229	100.00 %	17.97 %
Robbins	78	1,168	86,365	1,168	100.00 %	1.35 %
Robbinsville	120	597	84,907	597	100.00 %	0.70 %
Robersonville	23	1,269	88,865	1,269	100.00 %	1.43 %
Rockingham	52	9,243	84,383	9,243	100.00 %	10.95 %
Rockwell	76	2,302	89,815	2,302	100.00 %	2.56 %
Rocky Mount	23	54,341	88,865	15,414	28.37 %	17.35 %
	25	54,341	86,534	38,927	71.63 %	44.98 %
Rolesville	35	9,475	88,374	9,467	99.92 %	10.71 %
	39	9,475	90,164	8	0.08 %	0.01 %
Ronda	90	438	82,937	438	100.00 %	0.53 %
Roper	1	485	84,330	485	100.00 %	0.58 %
Roseboro	22	1,163	88,642	1,163	100.00 %	1.31 %
Rose Hill	4	1,371	83,095	1,371	100.00 %	1.65 %
Rosman	119	701	90,212	701	100.00 %	0.78 %
Rowland	46	885	83,445	885	100.00 %	1.06 %
Roxboro	2	8,134	90,793	8,134	100.00 %	8.96 %
Roxobel	23	187	88,865	187	100.00 %	0.21 %
Rural Hall	91	3,351	86,210	3,351	100.00 %	3.89 %
Ruth	113	347	89,058	347	100.00 %	0.39 %
Rutherford College	86	1,226	87,570	1,226	100.00 %	1.40 %
	87	1,226	85,758	0	0.00 %	0.00 %
Rutherfordton	113	3,640	89,058	3,640	100.00 %	4.09 %
St. Helena	16	417	90,663	417	100.00 %	0.46 %
St. James	19	6,529	91,041	6,529	100.00 %	7.17 %
St. Pauls	47	2,045	83,708	2,045	100.00 %	2.44 %
Salemburg	22	457	88,642	457	100.00 %	0.52 %
Salisbury	76	35,540	89,815	35,540	100.00 %	39.57 %
Saluda	113	631	89,058	631	100.00 %	0.71 %
Sandy Creek	17	248	89,763	248	100.00 %	0.28 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Sandyfield	46	430	83,445	430	100.00 %	0.52 %
Sanford	51	30,261	83,073	30,261	100.00 %	36.43 %
Saratoga	24	353	87,220	353	100.00 %	0.40 %
Sawmills	87	5,020	85,758	5,020	100.00 %	5.85 %
Scotland Neck	27	1,640	84,735	1,640	100.00 %	1.94 %
Seaboard	27	542	84,735	542	100.00 %	0.64 %
Seagrove	78	235	86,365	235	100.00 %	0.27 %
Sedalia	59	676	90,361	676	100.00 %	0.75 %
Selma	28	6,317	85,389	6,317	100.00 %	7.40 %
Seven Devils	85	313	90,863	38	12.14 %	0.04 %
	93	313	86,445	275	87.86 %	0.32 %
Seven Springs	4	55	83,095	55	100.00 %	0.07 %
Severn	27	191	84,735	191	100.00 %	0.23 %
Shallotte	17	4,185	89,763	4,185	100.00 %	4.66 %
Sharpsburg	23	1,697	88,865	215	12.67 %	0.24 %
	24	1,697	87,220	421	24.81 %	0.48 %
	25	1,697	86,534	1,061	62.52 %	1.23 %
Shelby	110	21,918	88,397	4,409	20.12 %	4.99 %
	111	21,918	89,894	17,509	79.88 %	19.48 %
Siler City	54	7,702	83,475	7,702	100.00 %	9.23 %
Simpson	9	390	84,450	390	100.00 %	0.46 %
Sims	24	275	87,220	275	100.00 %	0.32 %
Smithfield	28	11,292	85,389	11,292	100.00 %	13.22 %
Snow Hill	12	1,481	84,745	1,481	100.00 %	1.75 %
Southern Pines	52	15,545	84,383	15,545	100.00 %	18.42 %
	78	15,545	86,365	0	0.00 %	0.00 %
Southern Shores	1	3,090	84,330	3,090	100.00 %	3.66 %
Southport	19	3,971	91,041	3,971	100.00 %	4.36 %
Sparta	93	1,834	86,445	1,834	100.00 %	2.12 %
Speed	23	63	88,865	63	100.00 %	0.07 %
Spencer	76	3,308	89,815	3,308	100.00 %	3.68 %
Spencer Mountain	108	0	86,263	0	0.00 %	0.00 %
Spindale	113	4,225	89,058	4,225	100.00 %	4.74 %
Spring Hope	25	1,309	86,534	1,309	100.00 %	1.51 %
Spring Lake	42	11,660	85,537	11,660	100.00 %	13.63 %
Spruce Pine	85	2,194	90,863	2,194	100.00 %	2.41 %
Staley	54	397	83,475	397	100.00 %	0.48 %
Stallings	68	16,112	88,138	0	0.00 %	0.00 %
	69	16,112	85,179	15,728	97.62 %	18.46 %
	103	16,112	87,132	384	2.38 %	0.44 %
Stanfield	67	1,585	88,255	1,585	100.00 %	1.80 %
Stanley	108	3,963	86,263	3,963	100.00 %	4.59 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM

Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Stantonsburg	24	762	87,220	762	100.00 %	0.87 %
Star	67	806	88,255	806	100.00 %	0.91 %
Statesville	84	28,419	86,773	28,415	99.99 %	32.75 %
	89	28,419	85,577	4	0.01 %	0.00 %
Stedman	43	1,277	82,956	1,277	100.00 %	1.54 %
Stem	32	960	88,633	960	100.00 %	1.08 %
Stokesdale	62	5,924	89,579	5,924	100.00 %	6.61 %
Stoneville	65	1,308	91,096	1,308	100.00 %	1.44 %
Stonewall	79	214	83,163	214	100.00 %	0.26 %
Stovall	32	324	88,633	324	100.00 %	0.37 %
Sugar Mountain	85	371	90,863	371	100.00 %	0.41 %
Summerfield	57	10,951	90,615	746	6.81 %	0.82 %
	59	10,951	90,361	2,509	22.91 %	2.78 %
	62	10,951	89,579	7,696	70.28 %	8.59 %
Sunset Beach	17	4,175	89,763	4,175	100.00 %	4.65 %
Surf City	15	3,867	87,578	334	8.64 %	0.38 %
	16	3,867	90,663	3,533	91.36 %	3.90 %
Swansboro	14	3,744	86,538	3,744	100.00 %	4.33 %
Swepsonville	63	2,445	86,399	2,445	100.00 %	2.83 %
Sylva	119	2,578	90,212	2,578	100.00 %	2.86 %
Tabor City	46	3,781	83,445	3,781	100.00 %	4.53 %
Tarboro	23	10,721	88,865	10,721	100.00 %	12.06 %
Tar Heel	22	90	88,642	90	100.00 %	0.10 %
Taylorsville	94	2,320	90,835	2,320	100.00 %	2.55 %
Taylortown	52	634	84,383	4	0.63 %	0.00 %
	78	634	86,365	630	99.37 %	0.73 %
Teachey	4	448	83,095	448	100.00 %	0.54 %
Thomasville	70	27,183	89,118	521	1.92 %	0.58 %
	80	27,183	84,864	26,662	98.08 %	31.42 %
Tobaccoville	74	2,578	84,857	824	31.96 %	0.97 %
	91	2,578	86,210	1,754	68.04 %	2.03 %
Topsail Beach	16	461	90,663	461	100.00 %	0.51 %
Trenton	12	238	84,745	238	100.00 %	0.28 %
Trent Woods	3	4,074	85,099	4,074	100.00 %	4.79 %
Trinity	70	7,006	89,118	7,006	100.00 %	7.86 %
Troutman	84	3,698	86,773	885	23.93 %	1.02 %
	89	3,698	85,577	2,813	76.07 %	3.29 %
Troy	67	2,850	88,255	2,850	100.00 %	3.23 %
Tryon	113	1,562	89,058	1,562	100.00 %	1.75 %
Turkey	22	213	88,642	213	100.00 %	0.24 %
Unionville	69	6,643	85,179	6,643	100.00 %	7.80 %
Valdese	86	4,689	87,570	4,689	100.00 %	5.35 %

PEGDEN 5

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Vanceboro	3	869	85,099	869	100.00 %	1.02 %
Vandemere	79	246	83,163	246	100.00 %	0.30 %
Varnamtown	19	525	91,041	525	100.00 %	0.58 %
Vass	51	952	83,073	952	100.00 %	1.15 %
Waco	110	310	88,397	310	100.00 %	0.35 %
Wade	43	638	82,956	638	100.00 %	0.77 %
Wadesboro	55	5,008	87,005	5,008	100.00 %	5.76 %
Wagram	48	615	86,256	615	100.00 %	0.71 %
Wake Forest	7	47,601	83,510	1,504	3.16 %	1.80 %
	35	47,601	88,374	46,097	96.84 %	52.16 %
	66	47,601	83,189	0	0.00 %	0.00 %
Walkertown	71	5,692	84,874	3,176	55.80 %	3.74 %
	75	5,692	84,220	2,516	44.20 %	2.99 %
Wallace	4	3,413	83,095	3,413	100.00 %	4.11 %
	16	3,413	90,663	0	0.00 %	0.00 %
Wallburg	80	3,051	84,864	3,051	100.00 %	3.60 %
Walnut Cove	91	1,586	86,210	1,586	100.00 %	1.84 %
Walnut Creek	4	1,084	83,095	1,084	100.00 %	1.30 %
Walstonburg	12	193	84,745	193	100.00 %	0.23 %
Warrenton	27	851	84,735	851	100.00 %	1.00 %
Warsaw	4	2,733	83,095	2,733	100.00 %	3.29 %
Washington	79	9,875	83,163	9,875	100.00 %	11.87 %
Washington Park	79	392	83,163	392	100.00 %	0.47 %
Watha	16	181	90,663	181	100.00 %	0.20 %
Waxhaw	55	20,534	87,005	0	0.00 %	0.00 %
	68	20,534	88,138	20,534	100.00 %	23.30 %
Waynesville	118	10,140	83,282	10,140	100.00 %	12.18 %
Weaverville	114	4,567	89,685	4,567	100.00 %	5.09 %
Webster	119	372	90,212	372	100.00 %	0.41 %
Weddington	68	13,181	88,138	13,172	99.93 %	14.94 %
	69	13,181	85,179	4	0.03 %	0.00 %
	103	13,181	87,132	5	0.04 %	0.01 %
Weldon	27	1,444	84,735	1,444	100.00 %	1.70 %
Wendell	39	9,793	90,164	9,793	100.00 %	10.86 %
Wentworth	65	2,662	91,096	2,662	100.00 %	2.92 %
Wesley Chapel	55	8,681	87,005	3,868	44.56 %	4.45 %
	68	8,681	88,138	4,813	55.44 %	5.46 %
West Jefferson	93	1,279	86,445	1,279	100.00 %	1.48 %
Whispering Pines	52	4,987	84,383	4,987	100.00 %	5.91 %
Whitakers	23	627	88,865	290	46.25 %	0.33 %
	25	627	86,534	337	53.75 %	0.39 %
White Lake	22	843	88,642	843	100.00 %	0.95 %

PEGDEN 5

NC General Assembly

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Whiteville	46	4,766	83,445	4,766	100.00 %	5.71 %
Whitsett	59	584	90,361	584	100.00 %	0.65 %
Wilkesboro	94	3,687	90,835	3,687	100.00 %	4.06 %
Williamston	23	5,248	88,865	5,248	100.00 %	5.91 %
Wilmington	18	115,451	91,245	48,680	42.17 %	53.35 %
	19	115,451	91,041	8,207	7.11 %	9.01 %
	20	115,451	90,346	58,564	50.73 %	64.82 %
Wilson	24	47,851	87,220	47,851	100.00 %	54.86 %
Wilson's Mills	26	2,534	89,947	0	0.00 %	0.00 %
	28	2,534	85,389	2,534	100.00 %	2.97 %
Windsor	23	3,582	88,865	3,582	100.00 %	4.03 %
Winfall	1	555	84,330	555	100.00 %	0.66 %
Wingate	55	4,055	87,005	4,055	100.00 %	4.66 %
Winston-Salem	71	249,545	84,874	77,631	31.11 %	91.47 %
	72	249,545	86,949	86,867	34.81 %	99.91 %
	74	249,545	84,857	32,409	12.99 %	38.19 %
	75	249,545	84,220	22,818	9.14 %	27.09 %
	91	249,545	86,210	29,820	11.95 %	34.59 %
Winterville	8	10,462	85,793	44	0.42 %	0.05 %
	9	10,462	84,450	10,418	99.58 %	12.34 %
Winton	5	629	82,953	629	100.00 %	0.76 %
Woodfin	114	7,936	89,685	7,648	96.37 %	8.53 %
	116	7,936	89,505	288	3.63 %	0.32 %
Woodland	27	557	84,735	557	100.00 %	0.66 %
Wrightsville Beach	20	2,473	90,346	2,473	100.00 %	2.74 %
Yadkinville	77	2,995	90,628	2,995	100.00 %	3.30 %
Yanceyville	50	1,937	85,345	1,937	100.00 %	2.27 %
Youngsville	7	2,016	83,510	2,016	100.00 %	2.41 %
Zebulon	26	6,903	89,947	0	0.00 %	0.00 %
	39	6,903	90,164	6,903	100.00 %	7.66 %
			Total:	**6,017,605**		

Number of split municipalities: 112

Display: all municipalities

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Aberdeen	52	8,516	84,383	8,516	100.00 %	10.09 %
	78	8,516	86,365	0	0.00 %	0.00 %
Ahoskie	5	4,891	82,953	4,891	100.00 %	5.90 %
Alamance	64	988	85,016	988	100.00 %	1.16 %
Albemarle	67	16,432	88,255	16,432	100.00 %	18.62 %
Alliance	79	733	83,163	733	100.00 %	0.88 %
Andrews	120	1,667	84,907	1,667	100.00 %	1.96 %
Angier (Harnett)	6	4,709	87,332	4,709	100.00 %	5.39 %
Angier (Wake)	37	556	90,867	556	100.00 %	0.61 %
Ansonville	55	440	87,005	440	100.00 %	0.51 %
Apex	11	58,780	86,298	0	0.00 %	0.00 %
	21	58,780	86,179	556	0.95 %	0.65 %
	36	58,780	90,166	57,843	98.41 %	64.15 %
	41	58,780	89,887	381	0.65 %	0.42 %
Arapahoe	79	416	83,163	416	100.00 %	0.50 %
Archdale (Guilford)	60	380	89,735	380	100.00 %	0.42 %
Archdale (Randolph)	70	11,527	89,118	11,527	100.00 %	12.93 %
Archer Lodge	26	4,797	89,947	4,797	100.00 %	5.33 %
Asheboro	70	27,156	89,118	25,890	95.34 %	29.05 %
	78	27,156	86,365	1,266	4.66 %	1.47 %
Asheville	114	94,589	89,685	52,596	55.60 %	58.65 %
	115	94,589	90,262	29,236	30.91 %	32.39 %
	116	94,589	89,505	12,757	13.49 %	14.25 %
Askewville	23	184	88,865	184	100.00 %	0.21 %
Atkinson	16	296	90,663	296	100.00 %	0.33 %
Atlantic Beach	13	1,364	83,307	1,364	100.00 %	1.64 %
Aulander	23	763	88,865	763	100.00 %	0.86 %
Aurora	79	455	83,163	455	100.00 %	0.55 %
Autryville	22	167	88,642	167	100.00 %	0.19 %
Ayden	9	4,977	84,450	4,977	100.00 %	5.89 %
Badin	67	2,024	88,255	2,024	100.00 %	2.29 %
Bailey	24	568	87,220	568	100.00 %	0.65 %
Bakersville	85	450	90,863	450	100.00 %	0.50 %
Bald Head Island	19	268	91,041	268	100.00 %	0.29 %
Banner Elk	85	1,049	90,863	1,049	100.00 %	1.15 %
Bath	79	245	83,163	245	100.00 %	0.29 %
Bayboro	79	1,161	83,163	1,161	100.00 %	1.40 %
Bear Grass	23	89	88,865	89	100.00 %	0.10 %
Beaufort	13	4,464	83,307	4,464	100.00 %	5.36 %
Beech Mountain (Avery)	85	62	90,863	62	100.00 %	0.07 %
Beech Mountain (Watauga)	93	613	86,445	613	100.00 %	0.71 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Belhaven	79	1,410	83,163	1,410	100.00 %	1.70 %
Belmont	108	15,010	86,263	1,868	12.45 %	2.17 %
	109	15,010	87,762	13,142	87.55 %	14.97 %
Belville	17	2,406	89,763	2,406	100.00 %	2.68 %
Belwood	110	857	88,397	857	100.00 %	0.97 %
Benson (Harnett)	53	0	86,899	0	0.00 %	0.00 %
Benson (Johnston)	28	3,967	85,389	3,967	100.00 %	4.65 %
Bermuda Run	77	3,120	90,628	3,120	100.00 %	3.44 %
Bessemer City	110	5,428	88,397	5,428	100.00 %	6.14 %
Bethania	74	344	84,857	0	0.00 %	0.00 %
	91	344	86,210	344	100.00 %	0.40 %
Bethel	8	1,373	85,793	1,373	100.00 %	1.60 %
Beulaville	4	1,116	83,095	1,116	100.00 %	1.34 %
Biltmore Forest	116	1,409	89,505	1,409	100.00 %	1.57 %
Biscoe	67	1,848	88,255	1,848	100.00 %	2.09 %
Black Creek	24	692	87,220	692	100.00 %	0.79 %
Black Mountain	115	8,426	90,262	8,426	100.00 %	9.34 %
Bladenboro	22	1,648	88,642	1,648	100.00 %	1.86 %
Blowing Rock (Caldwell)	87	91	85,758	91	100.00 %	0.11 %
Blowing Rock (Watauga)	87	1,285	85,758	5	0.39 %	0.01 %
	93	1,285	86,445	1,280	99.61 %	1.48 %
Boardman	46	166	83,445	166	100.00 %	0.20 %
Bogue	13	695	83,307	695	100.00 %	0.83 %
Boiling Spring Lakes	19	5,943	91,041	5,943	100.00 %	6.53 %
Boiling Springs	111	4,615	89,894	4,615	100.00 %	5.13 %
Bolivia	19	149	91,041	149	100.00 %	0.16 %
Bolton	46	519	83,445	519	100.00 %	0.62 %
Boone	87	19,092	85,758	595	3.12 %	0.69 %
	93	19,092	86,445	18,497	96.88 %	21.40 %
Boonville	77	1,185	90,628	1,185	100.00 %	1.31 %
Bostic	111	355	89,894	355	100.00 %	0.39 %
Brevard	119	7,744	90,212	7,744	100.00 %	8.58 %
Bridgeton	3	349	85,099	349	100.00 %	0.41 %
Broadway (Harnett)	6	0	87,332	0	0.00 %	0.00 %
Broadway (Lee)	51	1,267	83,073	1,267	100.00 %	1.53 %
Brookford	96	442	89,587	442	100.00 %	0.49 %
Brunswick	46	973	83,445	973	100.00 %	1.17 %
Bryson City	119	1,558	90,212	1,558	100.00 %	1.73 %
Bunn	7	327	83,510	327	100.00 %	0.39 %
Burgaw	16	3,088	90,663	3,088	100.00 %	3.41 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Burlington (Alamance)	63	55,481	86,399	25,917	46.71 %	30.00 %
	64	55,481	85,016	29,564	53.29 %	34.77 %
Burlington (Guilford)	59	1,822	90,361	1,822	100.00 %	2.02 %
Burnsville	85	1,614	90,863	1,614	100.00 %	1.78 %
Butner	32	8,397	88,633	8,397	100.00 %	9.47 %
Cajah's Mountain	87	2,722	85,758	2,722	100.00 %	3.17 %
Calabash	17	2,011	89,763	2,011	100.00 %	2.24 %
Calypso	4	327	83,095	327	100.00 %	0.39 %
Cameron	51	244	83,073	244	100.00 %	0.29 %
Candor (Montgomery)	67	813	88,255	813	100.00 %	0.92 %
Candor (Moore)	78	0	86,365	0	0.00 %	0.00 %
Canton	118	4,422	83,282	4,422	100.00 %	5.31 %
Cape Carteret	13	2,224	83,307	2,224	100.00 %	2.67 %
Carolina Beach	19	6,564	91,041	6,564	100.00 %	7.21 %
Carolina Shores	17	4,588	89,763	4,588	100.00 %	5.11 %
Carrboro	50	21,295	85,345	174	0.82 %	0.20 %
	56	21,295	86,087	21,121	99.18 %	24.53 %
Carthage	51	2,775	83,073	2,747	98.99 %	3.31 %
	52	2,775	84,383	28	1.01 %	0.03 %
Cary (Chatham)	54	3,709	83,475	3,709	100.00 %	4.44 %
Cary (Wake)	11	171,012	86,298	43,537	25.46 %	50.45 %
	21	171,012	86,179	30,622	17.91 %	35.53 %
	36	171,012	90,166	0	0.00 %	0.00 %
	37	171,012	90,867	2,012	1.18 %	2.21 %
	41	171,012	89,887	74,074	43.32 %	82.41 %
	49	171,012	86,157	20,767	12.14 %	24.10 %
Casar	110	305	88,397	305	100.00 %	0.35 %
Castalia	25	264	86,534	264	100.00 %	0.31 %
Caswell Beach	19	395	91,041	395	100.00 %	0.43 %
Catawba	89	702	85,577	702	100.00 %	0.82 %
Cedar Point	13	1,764	83,307	1,764	100.00 %	2.12 %
Cedar Rock	87	301	85,758	301	100.00 %	0.35 %
Cerro Gordo	46	131	83,445	131	100.00 %	0.16 %
Chadbourn	46	1,574	83,445	1,574	100.00 %	1.89 %
Chapel Hill (Durham)	29	2,906	91,212	2,906	100.00 %	3.19 %
Chapel Hill (Orange)	56	59,054	86,087	59,054	100.00 %	68.60 %

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Charlotte	88	874,579	82,834	82,834	9.47 %	100.00 %
	92	874,579	85,031	63,762	7.29 %	74.99 %
	99	874,579	87,647	79,113	9.05 %	90.26 %
	100	874,579	87,197	87,197	9.97 %	100.00 %
	101	874,579	86,426	64,526	7.38 %	74.66 %
	102	874,579	86,179	86,179	9.85 %	100.00 %
	103	874,579	87,132	23,590	2.70 %	27.07 %
	104	874,579	86,520	86,520	9.89 %	100.00 %
	105	874,579	85,822	71,156	8.14 %	82.91 %
	106	874,579	82,824	79,717	9.11 %	96.25 %
	107	874,579	88,237	67,298	7.69 %	76.27 %
	112	874,579	82,806	82,687	9.45 %	99.86 %
Cherryville	110	6,078	88,397	6,078	100.00 %	6.88 %
Chimney Rock Village	113	140	89,058	140	100.00 %	0.16 %
China Grove	83	4,434	90,742	4,434	100.00 %	4.89 %
Chocowinity	79	722	83,163	722	100.00 %	0.87 %
Claremont	89	1,692	85,577	1,692	100.00 %	1.98 %
Clarkton	22	614	88,642	614	100.00 %	0.69 %
Clayton (Johnston)	26	26,307	89,947	26,307	100.00 %	29.25 %
Clayton (Wake)	38	0	88,226	0	0.00 %	0.00 %
	39	0	90,164	0	0.00 %	0.00 %
Clemmons	74	21,163	84,857	21,163	100.00 %	24.94 %
Cleveland	77	846	90,628	846	100.00 %	0.93 %
Clinton	22	8,383	88,642	8,383	100.00 %	9.46 %
Clyde	118	1,368	83,282	1,368	100.00 %	1.64 %
Coats	53	2,155	86,899	2,155	100.00 %	2.48 %
Cofield	5	267	82,953	267	100.00 %	0.32 %
Colerain	23	217	88,865	217	100.00 %	0.24 %
Columbia	1	610	84,330	610	100.00 %	0.72 %
Columbus	113	1,060	89,058	1,060	100.00 %	1.19 %
Como	5	67	82,953	67	100.00 %	0.08 %
Concord	73	105,240	90,649	32,447	30.83 %	35.79 %
	82	105,240	90,771	48,723	46.30 %	53.68 %
	83	105,240	90,742	24,070	22.87 %	26.53 %
Conetoe	23	198	88,865	198	100.00 %	0.22 %
Connelly Springs	86	1,529	87,570	1,529	100.00 %	1.75 %
Conover	89	8,421	85,577	424	5.04 %	0.50 %
	96	8,421	89,587	7,997	94.96 %	8.93 %
Conway	27	752	84,735	752	100.00 %	0.89 %
Cooleemee	77	940	90,628	940	100.00 %	1.04 %
Cornelius	98	31,412	86,827	31,412	100.00 %	36.18 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM

Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.

Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Cove City	3	378	85,099	378	100.00 %	0.44 %
Cramerton	108	5,296	86,263	96	1.81 %	0.11 %
	109	5,296	87,762	5,200	98.19 %	5.93 %
Creedmoor	7	4,866	83,510	2,065	42.44 %	2.47 %
	32	4,866	88,633	2,801	57.56 %	3.16 %
Creswell	1	207	84,330	207	100.00 %	0.25 %
Crossnore	85	143	90,863	143	100.00 %	0.16 %
Dallas	110	5,927	88,397	5,927	100.00 %	6.70 %
Danbury	91	189	86,210	189	100.00 %	0.22 %
Davidson (Iredell)	95	378	85,366	378	100.00 %	0.44 %
Davidson (Mecklenburg)	98	14,728	86,827	14,728	100.00 %	16.96 %
Dellview	110	6	88,397	6	100.00 %	0.01 %
Denton	80	1,494	84,864	1,494	100.00 %	1.76 %
Dillsboro	119	213	90,212	213	100.00 %	0.24 %
Dobbins Heights	52	687	84,383	687	100.00 %	0.81 %
Dobson	90	1,462	82,937	1,462	100.00 %	1.76 %
Dortches	25	1,082	86,534	1,082	100.00 %	1.25 %
Dover	3	349	85,099	349	100.00 %	0.41 %
Drexel	86	1,760	87,570	1,760	100.00 %	2.01 %
Dublin	22	267	88,642	267	100.00 %	0.30 %
Duck	1	742	84,330	742	100.00 %	0.88 %
Dunn	53	8,446	86,899	8,446	100.00 %	9.72 %
Durham (Durham)	2	283,093	90,793	25,167	8.89 %	27.72 %
	29	283,093	91,212	87,035	30.74 %	95.42 %
	30	283,093	91,165	89,671	31.68 %	98.36 %
	31	283,093	90,760	81,220	28.69 %	89.49 %
Durham (Orange)	50	144	85,345	144	100.00 %	0.17 %
Durham (Wake)	40	269	83,175	269	100.00 %	0.32 %
	49	269	86,157	0	0.00 %	0.00 %
Earl	111	198	89,894	198	100.00 %	0.22 %
East Arcadia	22	418	88,642	418	100.00 %	0.47 %
East Bend	77	634	90,628	634	100.00 %	0.70 %
East Laurinburg	48	234	86,256	234	100.00 %	0.27 %
East Spencer	76	1,567	89,815	1,567	100.00 %	1.74 %
Eastover	43	3,656	82,956	3,656	100.00 %	4.41 %
Eden	65	15,421	91,096	15,421	100.00 %	16.93 %
Edenton	1	4,460	84,330	4,460	100.00 %	5.29 %
Elizabeth City (Camden)	5	38	82,953	38	100.00 %	0.05 %
Elizabeth City (Pasquotank)	5	18,593	82,953	18,593	100.00 %	22.41 %
Elizabethtown	22	3,296	88,642	3,296	100.00 %	3.72 %
Elk Park	85	542	90,863	542	100.00 %	0.60 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Elkin (Surry)	90	4,049	82,937	4,049	100.00 %	4.88 %
Elkin (Wilkes)	90	73	82,937	73	100.00 %	0.09 %
Ellenboro	111	723	89,894	723	100.00 %	0.80 %
Ellerbe	52	864	84,383	864	100.00 %	1.02 %
Elm City (Nash)	25	0	86,534	0	0.00 %	0.00 %
Elm City (Wilson)	24	1,218	87,220	1,218	100.00 %	1.40 %
Elon	64	11,336	85,016	11,336	100.00 %	13.33 %
Emerald Isle	13	3,847	83,307	3,847	100.00 %	4.62 %
Enfield	27	1,865	84,735	1,865	100.00 %	2.20 %
Erwin	53	4,542	86,899	4,542	100.00 %	5.23 %
Eureka	10	214	82,953	214	100.00 %	0.26 %
Everetts	23	150	88,865	150	100.00 %	0.17 %
Fair Bluff	46	709	83,445	709	100.00 %	0.85 %
Fairmont	46	2,191	83,445	2,191	100.00 %	2.63 %
	47	2,191	83,708	0	0.00 %	0.00 %
Fairview	69	3,456	85,179	3,456	100.00 %	4.06 %
Faison (Duplin)	4	784	83,095	784	100.00 %	0.94 %
Faison (Sampson)	22	0	88,642	0	0.00 %	0.00 %
Faith	76	819	89,815	819	100.00 %	0.91 %
Falcon (Cumberland)	43	324	82,956	324	100.00 %	0.39 %
Falcon (Sampson)	22	0	88,642	0	0.00 %	0.00 %
Falkland	8	47	85,793	47	100.00 %	0.05 %
Fallston	110	627	88,397	627	100.00 %	0.71 %
Farmville	8	4,461	85,793	4,461	100.00 %	5.20 %
Fayetteville	42	208,501	85,537	65,401	31.37 %	76.46 %
	43	208,501	82,956	44,532	21.36 %	53.68 %
	44	208,501	83,297	83,293	39.95 %	100.00 %
	45	208,501	82,938	15,275	7.33 %	18.42 %
Flat Rock	113	3,486	89,058	3,486	100.00 %	3.91 %
Fletcher	117	7,987	91,035	7,987	100.00 %	8.77 %
Fontana Dam	120	13	84,907	13	100.00 %	0.02 %
Forest City	111	7,377	89,894	0	0.00 %	0.00 %
	113	7,377	89,058	7,377	100.00 %	8.28 %
Forest Hills	119	303	90,212	303	100.00 %	0.34 %
Fountain	8	385	85,793	385	100.00 %	0.45 %
Four Oaks	28	2,158	85,389	2,158	100.00 %	2.53 %
Foxfire	52	1,288	84,383	0	0.00 %	0.00 %
	78	1,288	86,365	1,288	100.00 %	1.49 %
Franklin	120	4,175	84,907	4,175	100.00 %	4.92 %
Franklinton	7	2,456	83,510	2,456	100.00 %	2.94 %
Franklinville	78	1,197	86,365	1,197	100.00 %	1.39 %

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Fremont	10	1,196	82,953	1,196	100.00 %	1.44 %
Fuquay-Varina (Harnett)	6	0	87,332	0	0.00 %	0.00 %
Fuquay-Varina (Wake)	21	34,152	86,179	30	0.09 %	0.03 %
	36	34,152	90,166	16	0.05 %	0.02 %
	37	34,152	90,867	34,106	99.87 %	37.53 %
Gamewell	87	3,702	85,758	3,702	100.00 %	4.32 %
Garland	22	595	88,642	595	100.00 %	0.67 %
Garner	21	31,159	86,179	11,789	37.83 %	13.68 %
	33	31,159	83,049	14	0.04 %	0.02 %
	37	31,159	90,867	0	0.00 %	0.00 %
	38	31,159	88,226	19,356	62.12 %	21.94 %
Garysburg	27	904	84,735	904	100.00 %	1.07 %
Gaston	27	1,008	84,735	1,008	100.00 %	1.19 %
Gastonia	108	80,411	86,263	28,480	35.42 %	33.02 %
	109	80,411	87,762	44,448	55.28 %	50.65 %
	110	80,411	88,397	7,483	9.31 %	8.47 %
Gatesville	5	267	82,953	267	100.00 %	0.32 %
Gibson	48	449	86,256	449	100.00 %	0.52 %
Gibsonville (Alamance)	64	4,278	85,016	4,278	100.00 %	5.03 %
Gibsonville (Guilford)	59	4,642	90,361	4,642	100.00 %	5.14 %
Glen Alpine	86	1,529	87,570	1,529	100.00 %	1.75 %
Godwin	43	128	82,956	128	100.00 %	0.15 %
Goldsboro	4	33,657	83,095	5	0.01 %	0.01 %
	10	33,657	82,953	33,652	99.99 %	40.57 %
Goldston	54	234	83,475	234	100.00 %	0.28 %
Graham	63	17,157	86,399	17,157	100.00 %	19.86 %
Grandfather Village	85	95	90,863	95	100.00 %	0.10 %
Granite Falls	87	4,965	85,758	4,965	100.00 %	5.79 %
Granite Quarry	76	2,984	89,815	2,984	100.00 %	3.32 %
Grantsboro	79	692	83,163	692	100.00 %	0.83 %
Green Level	63	3,152	86,399	3,152	100.00 %	3.65 %
Greenevers	4	567	83,095	567	100.00 %	0.68 %
Greensboro	57	299,035	90,615	83,540	27.94 %	92.19 %
	58	299,035	90,808	84,725	28.33 %	93.30 %
	59	299,035	90,361	13,852	4.63 %	15.33 %
	60	299,035	89,735	8,829	2.95 %	9.84 %
	61	299,035	90,201	90,201	30.16 %	100.00 %
	62	299,035	89,579	17,888	5.98 %	19.97 %
Greenville	8	87,521	85,793	52,881	60.42 %	61.64 %
	9	87,521	84,450	34,640	39.58 %	41.02 %
Grifton (Lenoir)	12	147	84,745	147	100.00 %	0.17 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Grifton (Pitt)	9	2,301	84,450	2,301	100.00 %	2.72 %
Grimesland	9	386	84,450	386	100.00 %	0.46 %
Grover	111	802	89,894	802	100.00 %	0.89 %
Halifax	27	170	84,735	170	100.00 %	0.20 %
Hamilton	23	306	88,865	306	100.00 %	0.34 %
Hamlet	52	6,025	84,383	6,025	100.00 %	7.14 %
Harmony	84	543	86,773	543	100.00 %	0.63 %
Harrells (Duplin)	4	0	83,095	0	0.00 %	0.00 %
Harrells (Sampson)	22	160	88,642	160	100.00 %	0.18 %
Harrellsville	5	85	82,953	85	100.00 %	0.10 %
Harrisburg	73	18,967	90,649	18,967	100.00 %	20.92 %
Hassell	23	49	88,865	49	100.00 %	0.06 %
Havelock	3	16,621	85,099	5,986	36.01 %	7.03 %
	13	16,621	83,307	10,635	63.99 %	12.77 %
Haw River	63	2,252	86,399	2,252	100.00 %	2.61 %
Hayesville	120	461	84,907	461	100.00 %	0.54 %
Hemby Bridge	69	1,614	85,179	1,614	100.00 %	1.89 %
Henderson	32	15,060	88,633	15,060	100.00 %	16.99 %
Hendersonville	113	15,137	89,058	623	4.12 %	0.70 %
	117	15,137	91,035	14,514	95.88 %	15.94 %
Hertford	1	1,934	84,330	1,934	100.00 %	2.29 %
Hickory (Burke)	86	79	87,570	79	100.00 %	0.09 %
Hickory (Caldwell)	87	32	85,758	32	100.00 %	0.04 %
Hickory (Catawba)	89	43,379	85,577	0	0.00 %	0.00 %
	96	43,379	89,587	43,379	100.00 %	48.42 %
High Point (Davidson)	80	6,646	84,864	6,646	100.00 %	7.83 %
High Point (Forsyth)	75	84	84,220	84	100.00 %	0.10 %
High Point (Guilford)	60	107,321	89,735	66,033	61.53 %	73.59 %
	62	107,321	89,579	41,288	38.47 %	46.09 %
High Point (Randolph)	70	8	89,118	8	100.00 %	0.01 %
High Shoals	110	595	88,397	595	100.00 %	0.67 %
Highlands (Jackson)	119	12	90,212	12	100.00 %	0.01 %
Highlands (Macon)	120	1,060	84,907	1,060	100.00 %	1.25 %
Hildebran	86	1,679	87,570	1,679	100.00 %	1.92 %
Hillsborough	50	9,660	85,345	9,660	100.00 %	11.32 %
Hobgood	27	268	84,735	268	100.00 %	0.32 %
Hoffman	52	418	84,383	418	100.00 %	0.50 %
Holden Beach	17	921	89,763	0	0.00 %	0.00 %
	19	921	91,041	921	100.00 %	1.01 %
Holly Ridge	15	4,171	87,578	4,171	100.00 %	4.76 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Holly Springs	21	41,239	86,179	11,892	28.84 %	13.80 %
	36	41,239	90,166	17,734	43.00 %	19.67 %
	37	41,239	90,867	11,613	28.16 %	12.78 %
Hookerton	12	413	84,745	413	100.00 %	0.49 %
Hope Mills	43	17,808	82,956	64	0.36 %	0.08 %
	45	17,808	82,938	17,744	99.64 %	21.39 %
Hot Springs	118	520	83,282	520	100.00 %	0.62 %
Hudson	87	3,780	85,758	3,780	100.00 %	4.41 %
Huntersville	98	61,376	86,827	38,677	63.02 %	44.54 %
	101	61,376	86,426	5,893	9.60 %	6.82 %
	107	61,376	88,237	16,806	27.38 %	19.05 %
Indian Beach	13	223	83,307	223	100.00 %	0.27 %
Indian Trail	55	39,997	87,005	2,376	5.94 %	2.73 %
	68	39,997	88,138	15,036	37.59 %	17.06 %
	69	39,997	85,179	22,585	56.47 %	26.51 %
Jackson	27	430	84,735	430	100.00 %	0.51 %
Jacksonville	14	72,723	86,538	28,456	39.13 %	32.88 %
	15	72,723	87,578	44,267	60.87 %	50.55 %
Jamestown	60	3,668	89,735	3,668	100.00 %	4.09 %
Jamesville	23	424	88,865	424	100.00 %	0.48 %
Jefferson	93	1,622	86,445	1,622	100.00 %	1.88 %
Jonesville	77	2,308	90,628	2,308	100.00 %	2.55 %
Kannapolis (Cabarrus)	82	42,846	90,771	33,907	79.14 %	37.35 %
	83	42,846	90,742	8,939	20.86 %	9.85 %
Kannapolis (Rowan)	83	10,268	90,742	10,268	100.00 %	11.32 %
Kelford	23	203	88,865	203	100.00 %	0.23 %
Kenansville	4	770	83,095	770	100.00 %	0.93 %
Kenly (Johnston)	28	1,293	85,389	1,293	100.00 %	1.51 %
Kenly (Wilson)	24	198	87,220	198	100.00 %	0.23 %
Kernersville (Forsyth)	71	25,947	84,874	0	0.00 %	0.00 %
	75	25,947	84,220	25,947	100.00 %	30.81 %
Kernersville (Guilford)	62	502	89,579	502	100.00 %	0.56 %
Kill Devil Hills	1	7,656	84,330	7,118	92.97 %	8.44 %
	79	7,656	83,163	538	7.03 %	0.65 %
King (Forsyth)	91	591	86,210	591	100.00 %	0.69 %
King (Stokes)	91	6,606	86,210	6,606	100.00 %	7.66 %
Kings Mountain (Cleveland)	110	10,032	88,397	8	0.08 %	0.01 %
	111	10,032	89,894	10,024	99.92 %	11.15 %
Kings Mountain (Gaston)	110	1,110	88,397	1,110	100.00 %	1.26 %
Kingstown	110	656	88,397	656	100.00 %	0.74 %
Kinston	12	19,900	84,745	19,900	100.00 %	23.48 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Kittrell	32	132	88,633	132	100.00 %	0.15 %
Kitty Hawk	1	3,689	84,330	3,689	100.00 %	4.37 %
Knightdale	38	19,435	88,226	0	0.00 %	0.00 %
	39	19,435	90,164	19,435	100.00 %	21.56 %
Kure Beach	19	2,191	91,041	2,191	100.00 %	2.41 %
La Grange	12	2,595	84,745	2,595	100.00 %	3.06 %
Lake Lure	113	1,365	89,058	1,365	100.00 %	1.53 %
Lake Park	69	3,269	85,179	3,269	100.00 %	3.84 %
Lake Santeetlah	120	38	84,907	38	100.00 %	0.04 %
Lake Waccamaw	46	1,296	83,445	1,296	100.00 %	1.55 %
Landis	83	3,690	90,742	3,690	100.00 %	4.07 %
Lansing	93	126	86,445	126	100.00 %	0.15 %
Lasker	27	64	84,735	64	100.00 %	0.08 %
Lattimore	111	406	89,894	406	100.00 %	0.45 %
Laurel Park	113	2,250	89,058	0	0.00 %	0.00 %
	117	2,250	91,035	2,250	100.00 %	2.47 %
Laurinburg	48	14,978	86,256	14,978	100.00 %	17.36 %
Lawndale	110	570	88,397	570	100.00 %	0.64 %
Leggett	23	37	88,865	37	100.00 %	0.04 %
Leland	17	22,908	89,763	22,908	100.00 %	25.52 %
Lenoir	87	18,352	85,758	18,352	100.00 %	21.40 %
Lewiston Woodville	23	426	88,865	426	100.00 %	0.48 %
Lewisville	74	13,381	84,857	13,381	100.00 %	15.77 %
Lexington	80	19,632	84,864	0	0.00 %	0.00 %
	81	19,632	84,066	19,632	100.00 %	23.35 %
Liberty	54	2,655	83,475	2,655	100.00 %	3.18 %
Lilesville	55	395	87,005	395	100.00 %	0.45 %
Lillington	6	4,735	87,332	882	18.63 %	1.01 %
	53	4,735	86,899	3,853	81.37 %	4.43 %
Lincolnton	97	11,091	86,810	11,091	100.00 %	12.78 %
Linden	43	136	82,956	136	100.00 %	0.16 %
Littleton	27	559	84,735	559	100.00 %	0.66 %
Locust (Cabarrus)	73	541	90,649	541	100.00 %	0.60 %
Locust (Stanly)	67	3,996	88,255	3,996	100.00 %	4.53 %
Long View (Burke)	86	735	87,570	735	100.00 %	0.84 %
Long View (Catawba)	96	4,353	89,587	4,353	100.00 %	4.86 %
Louisburg	7	3,064	83,510	3,064	100.00 %	3.67 %
Love Valley	84	154	86,773	154	100.00 %	0.18 %
Lowell	108	3,654	86,263	3,654	100.00 %	4.24 %
	109	3,654	87,762	0	0.00 %	0.00 %
Lucama	24	1,036	87,220	1,036	100.00 %	1.19 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Lumber Bridge	47	82	83,708	82	100.00 %	0.10 %
Lumberton	46	19,025	83,445	350	1.84 %	0.42 %
	47	19,025	83,708	18,675	98.16 %	22.31 %
Macclesfield	23	413	88,865	413	100.00 %	0.46 %
Macon	27	110	84,735	110	100.00 %	0.13 %
Madison	65	2,129	91,096	2,129	100.00 %	2.34 %
Maggie Valley	118	1,687	83,282	1,687	100.00 %	2.03 %
Magnolia	4	831	83,095	831	100.00 %	1.00 %
Maiden (Catawba)	89	3,736	85,577	3,736	100.00 %	4.37 %
Maiden (Lincoln)	97	0	86,810	0	0.00 %	0.00 %
Manteo	79	1,600	83,163	1,600	100.00 %	1.92 %
Marietta	46	111	83,445	111	100.00 %	0.13 %
Marion	85	7,717	90,863	7,717	100.00 %	8.49 %
Mars Hill	118	2,007	83,282	2,007	100.00 %	2.41 %
Marshall	118	777	83,282	777	100.00 %	0.93 %
Marshville	55	2,522	87,005	2,522	100.00 %	2.90 %
Marvin	68	6,358	88,138	6,358	100.00 %	7.21 %
Matthews	103	29,435	87,132	29,435	100.00 %	33.78 %
Maxton (Robeson)	46	1,902	83,445	1,902	100.00 %	2.28 %
Maxton (Scotland)	48	208	86,256	208	100.00 %	0.24 %
Mayodan	65	2,418	91,096	2,418	100.00 %	2.65 %
Maysville	12	818	84,745	818	100.00 %	0.97 %
McAdenville	108	890	86,263	890	100.00 %	1.03 %
McDonald	46	94	83,445	94	100.00 %	0.11 %
McFarlan	55	94	87,005	94	100.00 %	0.11 %
Mebane (Alamance)	63	14,626	86,399	14,626	100.00 %	16.93 %
Mebane (Orange)	50	3,171	85,345	3,171	100.00 %	3.72 %
Mesic	79	144	83,163	144	100.00 %	0.17 %
Micro	28	458	85,389	458	100.00 %	0.54 %
Middleburg	32	101	88,633	101	100.00 %	0.11 %
Middlesex	24	912	87,220	912	100.00 %	1.05 %
Midland (Cabarrus)	73	4,684	90,649	4,684	100.00 %	5.17 %
Midland (Mecklenburg)	103	0	87,132	0	0.00 %	0.00 %
Midway	80	4,742	84,864	3,469	73.15 %	4.09 %
	81	4,742	84,066	1,273	26.85 %	1.51 %
Mills River	117	7,078	91,035	7,078	100.00 %	7.78 %
Milton	50	155	85,345	155	100.00 %	0.18 %
Mineral Springs	55	3,159	87,005	2,293	72.59 %	2.64 %
	68	3,159	88,138	866	27.41 %	0.98 %
Minnesott Beach	79	530	83,163	530	100.00 %	0.64 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Mint Hill (Mecklenburg)	99	26,444	87,647	0	0.00 %	0.00 %
	103	26,444	87,132	26,444	100.00 %	30.35 %
Mint Hill (Union)	69	6	85,179	6	100.00 %	0.01 %
Misenheimer	67	650	88,255	650	100.00 %	0.74 %
Mocksville	77	5,900	90,628	5,900	100.00 %	6.51 %
Momeyer	25	277	86,534	277	100.00 %	0.32 %
Monroe	55	34,562	87,005	12,650	36.60 %	14.54 %
	69	34,562	85,179	21,912	63.40 %	25.72 %
Montreat	115	901	90,262	901	100.00 %	1.00 %
Mooresboro	111	293	89,894	293	100.00 %	0.33 %
Mooresville	84	50,193	86,773	205	0.41 %	0.24 %
	95	50,193	85,366	49,988	99.59 %	58.56 %
Morehead City	13	9,556	83,307	9,556	100.00 %	11.47 %
Morganton	86	17,474	87,570	17,474	100.00 %	19.95 %
Morrisville (Durham)	31	207	90,760	207	100.00 %	0.23 %
Morrisville (Wake)	11	29,423	86,298	0	0.00 %	0.00 %
	41	29,423	89,887	14,239	48.39 %	15.84 %
	49	29,423	86,157	15,184	51.61 %	17.62 %
Morven	55	329	87,005	329	100.00 %	0.38 %
Mount Airy	90	10,676	82,937	10,676	100.00 %	12.87 %
Mount Gilead	67	1,171	88,255	1,171	100.00 %	1.33 %
Mount Holly	108	17,703	86,263	17,703	100.00 %	20.52 %
Mount Olive (Duplin)	4	5	83,095	5	100.00 %	0.01 %
Mount Olive (Wayne)	4	4,193	83,095	4,193	100.00 %	5.05 %
Mount Pleasant	73	1,671	90,649	1,671	100.00 %	1.84 %
Murfreesboro	5	2,619	82,953	2,619	100.00 %	3.16 %
Murphy	120	1,608	84,907	1,608	100.00 %	1.89 %
Nags Head	79	3,168	83,163	3,168	100.00 %	3.81 %
Nashville	25	5,632	86,534	5,632	100.00 %	6.51 %
Navassa	17	1,367	89,763	1,367	100.00 %	1.52 %
New Bern	3	31,291	85,099	31,291	100.00 %	36.77 %
New London	67	607	88,255	607	100.00 %	0.69 %
Newland	85	715	90,863	715	100.00 %	0.79 %
Newport	13	4,364	83,307	4,364	100.00 %	5.24 %
Newton	89	13,148	85,577	13,148	100.00 %	15.36 %
	96	13,148	89,587	0	0.00 %	0.00 %
Newton Grove	22	585	88,642	585	100.00 %	0.66 %
Norlina	27	920	84,735	920	100.00 %	1.09 %
Norman	52	100	84,383	100	100.00 %	0.12 %
North Topsail Beach	15	1,005	87,578	1,005	100.00 %	1.15 %
North Wilkesboro	94	4,382	90,835	4,382	100.00 %	4.82 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Northwest	17	703	89,763	703	100.00 %	0.78 %
Norwood	67	2,367	88,255	2,367	100.00 %	2.68 %
Oak City	23	266	88,865	266	100.00 %	0.30 %
Oak Island	19	8,396	91,041	8,396	100.00 %	9.22 %
Oak Ridge	62	7,474	89,579	7,474	100.00 %	8.34 %
Oakboro	67	2,128	88,255	2,128	100.00 %	2.41 %
Ocean Isle Beach	17	867	89,763	867	100.00 %	0.97 %
Old Fort	85	811	90,863	811	100.00 %	0.89 %
Oriental	79	880	83,163	880	100.00 %	1.06 %
Orrum	46	59	83,445	59	100.00 %	0.07 %
Ossipee	64	536	85,016	536	100.00 %	0.63 %
Oxford	32	8,628	88,633	8,628	100.00 %	9.73 %
Pantego	79	164	83,163	164	100.00 %	0.20 %
Parkton	47	504	83,708	504	100.00 %	0.60 %
Parmele	23	243	88,865	243	100.00 %	0.27 %
Patterson Springs	111	571	89,894	571	100.00 %	0.64 %
Peachland	55	390	87,005	390	100.00 %	0.45 %
Peletier	13	769	83,307	769	100.00 %	0.92 %
Pembroke	47	2,823	83,708	2,823	100.00 %	3.37 %
Pikeville	10	712	82,953	712	100.00 %	0.86 %
Pilot Mountain	90	1,440	82,937	1,440	100.00 %	1.74 %
Pine Knoll Shores	13	1,388	83,307	1,388	100.00 %	1.67 %
Pine Level	28	2,046	85,389	2,046	100.00 %	2.40 %
Pinebluff	52	1,473	84,383	1,473	100.00 %	1.75 %
Pinehurst	52	17,581	84,383	8	0.05 %	0.01 %
	78	17,581	86,365	17,573	99.95 %	20.35 %
Pinetops	23	1,200	88,865	1,200	100.00 %	1.35 %
Pineville	105	10,602	85,822	10,602	100.00 %	12.35 %
	112	10,602	82,806	0	0.00 %	0.00 %
Pink Hill	12	451	84,745	451	100.00 %	0.53 %
Pittsboro	54	4,537	83,475	4,537	100.00 %	5.44 %
Pleasant Garden	59	5,000	90,361	5,000	100.00 %	5.53 %
Plymouth	1	3,320	84,330	3,320	100.00 %	3.94 %
Polkton	55	2,250	87,005	2,250	100.00 %	2.59 %
Polkville	110	516	88,397	516	100.00 %	0.58 %
Pollocksville	12	268	84,745	268	100.00 %	0.32 %
Powellsville	23	189	88,865	189	100.00 %	0.21 %
Princeton	28	1,315	85,389	1,315	100.00 %	1.54 %
Princeville	23	1,254	88,865	1,254	100.00 %	1.41 %
Proctorville	46	121	83,445	121	100.00 %	0.15 %
Raeford	48	4,559	86,256	4,559	100.00 %	5.29 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Raleigh (Durham)	2	1,559	90,793	1,326	85.05 %	1.46 %
	31	1,559	90,760	233	14.95 %	0.26 %
Raleigh (Wake)	11	466,106	86,298	40,792	8.75 %	47.27 %
	21	466,106	86,179	13	0.00 %	0.02 %
	33	466,106	83,049	82,480	17.70 %	99.31 %
	34	466,106	83,679	83,503	17.92 %	99.79 %
	35	466,106	88,374	6,171	1.32 %	6.98 %
	38	466,106	88,226	56,840	12.19 %	64.43 %
	39	466,106	90,164	13,011	2.79 %	14.43 %
	40	466,106	83,175	57,345	12.30 %	68.94 %
	49	466,106	86,157	47,783	10.25 %	55.46 %
	66	466,106	83,189	78,168	16.77 %	93.96 %
Ramseur	78	1,774	86,365	1,774	100.00 %	2.05 %
Randleman	70	4,595	89,118	4,595	100.00 %	5.16 %
Ranlo	108	4,511	86,263	4,500	99.76 %	5.22 %
	110	4,511	88,397	11	0.24 %	0.01 %
Raynham	46	60	83,445	60	100.00 %	0.07 %
Red Cross	67	762	88,255	762	100.00 %	0.86 %
Red Oak	25	3,342	86,534	3,342	100.00 %	3.86 %
Red Springs (Hoke)	48	0	86,256	0	0.00 %	0.00 %
Red Springs (Robeson)	47	3,087	83,708	3,087	100.00 %	3.69 %
Reidsville	65	14,583	91,096	14,583	100.00 %	16.01 %
Rennert	47	275	83,708	275	100.00 %	0.33 %
Rhodhiss (Burke)	86	639	87,570	639	100.00 %	0.73 %
Rhodhiss (Caldwell)	87	358	85,758	358	100.00 %	0.42 %
Rich Square	27	894	84,735	894	100.00 %	1.06 %
Richfield	67	582	88,255	582	100.00 %	0.66 %
Richlands	16	2,287	90,663	2,287	100.00 %	2.52 %
River Bend	3	2,902	85,099	2,902	100.00 %	3.41 %
Roanoke Rapids	27	15,229	84,735	15,229	100.00 %	17.97 %
Robbins	78	1,168	86,365	1,168	100.00 %	1.35 %
Robbinsville	120	597	84,907	597	100.00 %	0.70 %
Robersonville	23	1,269	88,865	1,269	100.00 %	1.43 %
Rockingham	52	9,243	84,383	9,243	100.00 %	10.95 %
Rockwell	76	2,302	89,815	2,302	100.00 %	2.56 %
Rocky Mount (Edgecombe)	23	15,414	88,865	15,414	100.00 %	17.35 %
Rocky Mount (Nash)	25	38,927	86,534	38,927	100.00 %	44.98 %
Rolesville	35	9,475	88,374	9,467	99.92 %	10.71 %
	39	9,475	90,164	8	0.08 %	0.01 %
Ronda	90	438	82,937	438	100.00 %	0.53 %
Roper	1	485	84,330	485	100.00 %	0.58 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Rose Hill	4	1,371	83,095	1,371	100.00 %	1.65 %
Roseboro	22	1,163	88,642	1,163	100.00 %	1.31 %
Rosman	119	701	90,212	701	100.00 %	0.78 %
Rowland	46	885	83,445	885	100.00 %	1.06 %
Roxboro	2	8,134	90,793	8,134	100.00 %	8.96 %
Roxobel	23	187	88,865	187	100.00 %	0.21 %
Rural Hall	91	3,351	86,210	3,351	100.00 %	3.89 %
Ruth	113	347	89,058	347	100.00 %	0.39 %
Rutherford College (Burke)	86	1,226	87,570	1,226	100.00 %	1.40 %
Rutherford College (Caldwell)	87	0	85,758	0	0.00 %	0.00 %
Rutherfordton	113	3,640	89,058	3,640	100.00 %	4.09 %
Salemburg	22	457	88,642	457	100.00 %	0.52 %
Salisbury	76	35,540	89,815	35,540	100.00 %	39.57 %
Saluda (Henderson)	113	11	89,058	11	100.00 %	0.01 %
Saluda (Polk)	113	620	89,058	620	100.00 %	0.70 %
Sandy Creek	17	248	89,763	248	100.00 %	0.28 %
Sandyfield	46	430	83,445	430	100.00 %	0.52 %
Sanford	51	30,261	83,073	30,261	100.00 %	36.43 %
Saratoga	24	353	87,220	353	100.00 %	0.40 %
Sawmills	87	5,020	85,758	5,020	100.00 %	5.85 %
Scotland Neck	27	1,640	84,735	1,640	100.00 %	1.94 %
Seaboard	27	542	84,735	542	100.00 %	0.64 %
Seagrove	78	235	86,365	235	100.00 %	0.27 %
Sedalia	59	676	90,361	676	100.00 %	0.75 %
Selma	28	6,317	85,389	6,317	100.00 %	7.40 %
Seven Devils (Avery)	85	38	90,863	38	100.00 %	0.04 %
Seven Devils (Watauga)	93	275	86,445	275	100.00 %	0.32 %
Seven Springs	4	55	83,095	55	100.00 %	0.07 %
Severn	27	191	84,735	191	100.00 %	0.23 %
Shallotte	17	4,185	89,763	4,185	100.00 %	4.66 %
Sharpsburg (Edgecombe)	23	215	88,865	215	100.00 %	0.24 %
Sharpsburg (Nash)	25	1,061	86,534	1,061	100.00 %	1.23 %
Sharpsburg (Wilson)	24	421	87,220	421	100.00 %	0.48 %
Shelby	110	21,918	88,397	4,409	20.12 %	4.99 %
	111	21,918	89,894	17,509	79.88 %	19.48 %
Siler City	54	7,702	83,475	7,702	100.00 %	9.23 %
Simpson	9	390	84,450	390	100.00 %	0.46 %
Sims	24	275	87,220	275	100.00 %	0.32 %
Smithfield	28	11,292	85,389	11,292	100.00 %	13.22 %
Snow Hill	12	1,481	84,745	1,481	100.00 %	1.75 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Southern Pines	52	15,545	84,383	15,545	100.00 %	18.42 %
	78	15,545	86,365	0	0.00 %	0.00 %
Southern Shores	1	3,090	84,330	3,090	100.00 %	3.66 %
Southport	19	3,971	91,041	3,971	100.00 %	4.36 %
Sparta	93	1,834	86,445	1,834	100.00 %	2.12 %
Speed	23	63	88,865	63	100.00 %	0.07 %
Spencer	76	3,308	89,815	3,308	100.00 %	3.68 %
Spencer Mountain	108	0	86,263	0	0.00 %	0.00 %
Spindale	113	4,225	89,058	4,225	100.00 %	4.74 %
Spring Hope	25	1,309	86,534	1,309	100.00 %	1.51 %
Spring Lake	42	11,660	85,537	11,660	100.00 %	13.63 %
Spruce Pine	85	2,194	90,863	2,194	100.00 %	2.41 %
St. Helena	16	417	90,663	417	100.00 %	0.46 %
St. James	19	6,529	91,041	6,529	100.00 %	7.17 %
St. Pauls	47	2,045	83,708	2,045	100.00 %	2.44 %
Staley	54	397	83,475	397	100.00 %	0.48 %
Stallings (Mecklenburg)	103	384	87,132	384	100.00 %	0.44 %
Stallings (Union)	68	15,728	88,138	0	0.00 %	0.00 %
	69	15,728	85,179	15,728	100.00 %	18.46 %
Stanfield	67	1,585	88,255	1,585	100.00 %	1.80 %
Stanley	108	3,963	86,263	3,963	100.00 %	4.59 %
Stantonsburg	24	762	87,220	762	100.00 %	0.87 %
Star	67	806	88,255	806	100.00 %	0.91 %
Statesville	84	28,419	86,773	28,415	99.99 %	32.75 %
	89	28,419	85,577	4	0.01 %	0.00 %
Stedman	43	1,277	82,956	1,277	100.00 %	1.54 %
Stem	32	960	88,633	960	100.00 %	1.08 %
Stokesdale	62	5,924	89,579	5,924	100.00 %	6.61 %
Stoneville	65	1,308	91,096	1,308	100.00 %	1.44 %
Stonewall	79	214	83,163	214	100.00 %	0.26 %
Stovall	32	324	88,633	324	100.00 %	0.37 %
Sugar Mountain	85	371	90,863	371	100.00 %	0.41 %
Summerfield	57	10,951	90,615	746	6.81 %	0.82 %
	59	10,951	90,361	2,509	22.91 %	2.78 %
	62	10,951	89,579	7,696	70.28 %	8.59 %
Sunset Beach	17	4,175	89,763	4,175	100.00 %	4.65 %
Surf City (Onslow)	15	334	87,578	334	100.00 %	0.38 %
Surf City (Pender)	16	3,533	90,663	3,533	100.00 %	3.90 %
Swansboro	14	3,744	86,538	3,744	100.00 %	4.33 %
Swepsonville	63	2,445	86,399	2,445	100.00 %	2.83 %
Sylva	119	2,578	90,212	2,578	100.00 %	2.86 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Tabor City	46	3,781	83,445	3,781	100.00 %	4.53 %
Tar Heel	22	90	88,642	90	100.00 %	0.10 %
Tarboro	23	10,721	88,865	10,721	100.00 %	12.06 %
Taylorsville	94	2,320	90,835	2,320	100.00 %	2.55 %
Taylortown	52	634	84,383	4	0.63 %	0.00 %
	78	634	86,365	630	99.37 %	0.73 %
Teachey	4	448	83,095	448	100.00 %	0.54 %
Thomasville (Davidson)	80	26,662	84,864	26,662	100.00 %	31.42 %
Thomasville (Randolph)	70	521	89,118	521	100.00 %	0.58 %
Tobaccoville (Forsyth)	74	2,578	84,857	824	31.96 %	0.97 %
	91	2,578	86,210	1,754	68.04 %	2.03 %
Tobaccoville (Stokes)	91	0	86,210	0	0.00 %	0.00 %
Topsail Beach	16	461	90,663	461	100.00 %	0.51 %
Trent Woods	3	4,074	85,099	4,074	100.00 %	4.79 %
Trenton	12	238	84,745	238	100.00 %	0.28 %
Trinity	70	7,006	89,118	7,006	100.00 %	7.86 %
Troutman	84	3,698	86,773	885	23.93 %	1.02 %
	89	3,698	85,577	2,813	76.07 %	3.29 %
Troy	67	2,850	88,255	2,850	100.00 %	3.23 %
Tryon	113	1,562	89,058	1,562	100.00 %	1.75 %
Turkey	22	213	88,642	213	100.00 %	0.24 %
Unionville	69	6,643	85,179	6,643	100.00 %	7.80 %
Valdese	86	4,689	87,570	4,689	100.00 %	5.35 %
Vanceboro	3	869	85,099	869	100.00 %	1.02 %
Vandemere	79	246	83,163	246	100.00 %	0.30 %
Varnamtown	19	525	91,041	525	100.00 %	0.58 %
Vass	51	952	83,073	952	100.00 %	1.15 %
Waco	110	310	88,397	310	100.00 %	0.35 %
Wade	43	638	82,956	638	100.00 %	0.77 %
Wadesboro	55	5,008	87,005	5,008	100.00 %	5.76 %
Wagram	48	615	86,256	615	100.00 %	0.71 %
Wake Forest (Franklin)	7	1,504	83,510	1,504	100.00 %	1.80 %
Wake Forest (Wake)	35	46,097	88,374	46,097	100.00 %	52.16 %
	66	46,097	83,189	0	0.00 %	0.00 %
Walkertown	71	5,692	84,874	3,176	55.80 %	3.74 %
	75	5,692	84,220	2,516	44.20 %	2.99 %
Wallace (Duplin)	4	3,413	83,095	3,413	100.00 %	4.11 %
Wallace (Pender)	16	0	90,663	0	0.00 %	0.00 %
Wallburg	80	3,051	84,864	3,051	100.00 %	3.60 %
Walnut Cove	91	1,586	86,210	1,586	100.00 %	1.84 %
Walnut Creek	4	1,084	83,095	1,084	100.00 %	1.30 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Walstonburg	12	193	84,745	193	100.00 %	0.23 %
Warrenton	27	851	84,735	851	100.00 %	1.00 %
Warsaw	4	2,733	83,095	2,733	100.00 %	3.29 %
Washington	79	9,875	83,163	9,875	100.00 %	11.87 %
Washington Park	79	392	83,163	392	100.00 %	0.47 %
Watha	16	181	90,663	181	100.00 %	0.20 %
Waxhaw	55	20,534	87,005	0	0.00 %	0.00 %
	68	20,534	88,138	20,534	100.00 %	23.30 %
Waynesville	118	10,140	83,282	10,140	100.00 %	12.18 %
Weaverville	114	4,567	89,685	4,567	100.00 %	5.09 %
Webster	119	372	90,212	372	100.00 %	0.41 %
Weddington (Mecklenburg)	103	5	87,132	5	100.00 %	0.01 %
Weddington (Union)	68	13,176	88,138	13,172	99.97 %	14.94 %
	69	13,176	85,179	4	0.03 %	0.00 %
Weldon	27	1,444	84,735	1,444	100.00 %	1.70 %
Wendell	39	9,793	90,164	9,793	100.00 %	10.86 %
Wentworth	65	2,662	91,096	2,662	100.00 %	2.92 %
Wesley Chapel	55	8,681	87,005	3,868	44.56 %	4.45 %
	68	8,681	88,138	4,813	55.44 %	5.46 %
West Jefferson	93	1,279	86,445	1,279	100.00 %	1.48 %
Whispering Pines	52	4,987	84,383	4,987	100.00 %	5.91 %
Whitakers (Edgecombe)	23	290	88,865	290	100.00 %	0.33 %
Whitakers (Nash)	25	337	86,534	337	100.00 %	0.39 %
White Lake	22	843	88,642	843	100.00 %	0.95 %
Whiteville	46	4,766	83,445	4,766	100.00 %	5.71 %
Whitsett	59	584	90,361	584	100.00 %	0.65 %
Wilkesboro	94	3,687	90,835	3,687	100.00 %	4.06 %
Williamston	23	5,248	88,865	5,248	100.00 %	5.91 %
Wilmington	18	115,451	91,245	48,680	42.17 %	53.35 %
	19	115,451	91,041	8,207	7.11 %	9.01 %
	20	115,451	90,346	58,564	50.73 %	64.82 %
Wilson	24	47,851	87,220	47,851	100.00 %	54.86 %
Wilson's Mills	26	2,534	89,947	0	0.00 %	0.00 %
	28	2,534	85,389	2,534	100.00 %	2.97 %
Windsor	23	3,582	88,865	3,582	100.00 %	4.03 %
Winfall	1	555	84,330	555	100.00 %	0.66 %
Wingate	55	4,055	87,005	4,055	100.00 %	4.66 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

PEGDEN 5

NC General Assembly

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Winston-Salem	71	249,545	84,874	77,631	31.11 %	91.47 %
	72	249,545	86,949	86,867	34.81 %	99.91 %
	74	249,545	84,857	32,409	12.99 %	38.19 %
	75	249,545	84,220	22,818	9.14 %	27.09 %
	91	249,545	86,210	29,820	11.95 %	34.59 %
Winterville	8	10,462	85,793	44	0.42 %	0.05 %
	9	10,462	84,450	10,418	99.58 %	12.34 %
Winton	5	629	82,953	629	100.00 %	0.76 %
Woodfin	114	7,936	89,685	7,648	96.37 %	8.53 %
	116	7,936	89,505	288	3.63 %	0.32 %
Woodland	27	557	84,735	557	100.00 %	0.66 %
Wrightsville Beach	20	2,473	90,346	2,473	100.00 %	2.74 %
Yadkinville	77	2,995	90,628	2,995	100.00 %	3.30 %
Yanceyville	50	1,937	85,345	1,937	100.00 %	2.27 %
Youngsville	7	2,016	83,510	2,016	100.00 %	2.41 %
Zebulon (Johnston)	26	0	89,947	0	0.00 %	0.00 %
Zebulon (Wake)	39	6,903	90,164	6,903	100.00 %	7.66 %
			Total:	**6,017,605**		

Number of municipalities split within counties: 81

Display: all municipalities

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM

Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.

Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

[G20-MbCD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
1	Columbia	84,330	610	610	0.72 %	100.00 %
	Creswell	84,330	207	207	0.25 %	100.00 %
	Duck	84,330	742	742	0.88 %	100.00 %
	Edenton	84,330	4,460	4,460	5.29 %	100.00 %
	Hertford	84,330	1,934	1,934	2.29 %	100.00 %
	Kill Devil Hills	84,330	7,656	7,118	8.44 %	92.97 %
	Kitty Hawk	84,330	3,689	3,689	4.37 %	100.00 %
	Plymouth	84,330	3,320	3,320	3.94 %	100.00 %
	Roper	84,330	485	485	0.58 %	100.00 %
	Southern Shores	84,330	3,090	3,090	3.66 %	100.00 %
	Winfall	84,330	555	555	0.66 %	100.00 %
2	Durham (Durham)	90,793	283,093	25,167	27.72 %	8.89 %
	Raleigh (Durham)	90,793	1,559	1,326	1.46 %	85.05 %
	Roxboro	90,793	8,134	8,134	8.96 %	100.00 %
3	Bridgeton	85,099	349	349	0.41 %	100.00 %
	Cove City	85,099	378	378	0.44 %	100.00 %
	Dover	85,099	349	349	0.41 %	100.00 %
	Havelock	85,099	16,621	5,986	7.03 %	36.01 %
	New Bern	85,099	31,291	31,291	36.77 %	100.00 %
	River Bend	85,099	2,902	2,902	3.41 %	100.00 %
	Trent Woods	85,099	4,074	4,074	4.79 %	100.00 %
	Vanceboro	85,099	869	869	1.02 %	100.00 %
4	Beulaville	83,095	1,116	1,116	1.34 %	100.00 %
	Calypso	83,095	327	327	0.39 %	100.00 %
	Faison (Duplin)	83,095	784	784	0.94 %	100.00 %
	Goldsboro	83,095	33,657	5	0.01 %	0.01 %
	Greenevers	83,095	567	567	0.68 %	100.00 %
	Harrells (Duplin)	83,095	0	0	0.00 %	0.00 %
	Kenansville	83,095	770	770	0.93 %	100.00 %
	Magnolia	83,095	831	831	1.00 %	100.00 %
	Mount Olive (Duplin)	83,095	5	5	0.01 %	100.00 %
	Mount Olive (Wayne)	83,095	4,193	4,193	5.05 %	100.00 %
	Rose Hill	83,095	1,371	1,371	1.65 %	100.00 %
	Seven Springs	83,095	55	55	0.07 %	100.00 %
	Teachey	83,095	448	448	0.54 %	100.00 %
	Wallace (Duplin)	83,095	3,413	3,413	4.11 %	100.00 %
	Walnut Creek	83,095	1,084	1,084	1.30 %	100.00 %
	Warsaw	83,095	2,733	2,733	3.29 %	100.00 %
5	Ahoskie	82,953	4,891	4,891	5.90 %	100.00 %
	Cofield	82,953	267	267	0.32 %	100.00 %
	Como	82,953	67	67	0.08 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
5	Elizabeth City (Camden)	82,953	38	38	0.05 %	100.00 %
	Elizabeth City (Pasquotank)	82,953	18,593	18,593	22.41 %	100.00 %
	Gatesville	82,953	267	267	0.32 %	100.00 %
	Harrellsville	82,953	85	85	0.10 %	100.00 %
	Murfreesboro	82,953	2,619	2,619	3.16 %	100.00 %
	Winton	82,953	629	629	0.76 %	100.00 %
6	Angier (Harnett)	87,332	4,709	4,709	5.39 %	100.00 %
	Broadway (Harnett)	87,332	0	0	0.00 %	0.00 %
	Fuquay-Varina (Harnett)	87,332	0	0	0.00 %	0.00 %
	Lillington	87,332	4,735	882	1.01 %	18.63 %
7	Bunn	83,510	327	327	0.39 %	100.00 %
	Creedmoor	83,510	4,866	2,065	2.47 %	42.44 %
	Franklinton	83,510	2,456	2,456	2.94 %	100.00 %
	Louisburg	83,510	3,064	3,064	3.67 %	100.00 %
	Wake Forest (Franklin)	83,510	1,504	1,504	1.80 %	100.00 %
	Youngsville	83,510	2,016	2,016	2.41 %	100.00 %
8	Bethel	85,793	1,373	1,373	1.60 %	100.00 %
	Falkland	85,793	47	47	0.05 %	100.00 %
	Farmville	85,793	4,461	4,461	5.20 %	100.00 %
	Fountain	85,793	385	385	0.45 %	100.00 %
	Greenville	85,793	87,521	52,881	61.64 %	60.42 %
	Winterville	85,793	10,462	44	0.05 %	0.42 %
9	Ayden	84,450	4,977	4,977	5.89 %	100.00 %
	Greenville	84,450	87,521	34,640	41.02 %	39.58 %
	Grifton (Pitt)	84,450	2,301	2,301	2.72 %	100.00 %
	Grimesland	84,450	386	386	0.46 %	100.00 %
	Simpson	84,450	390	390	0.46 %	100.00 %
	Winterville	84,450	10,462	10,418	12.34 %	99.58 %
10	Eureka	82,953	214	214	0.26 %	100.00 %
	Fremont	82,953	1,196	1,196	1.44 %	100.00 %
	Goldsboro	82,953	33,657	33,652	40.57 %	99.99 %
	Pikeville	82,953	712	712	0.86 %	100.00 %
11	Apex	86,298	58,780	0	0.00 %	0.00 %
	Cary (Wake)	86,298	171,012	43,537	50.45 %	25.46 %
	Morrisville (Wake)	86,298	29,423	0	0.00 %	0.00 %
	Raleigh (Wake)	86,298	466,106	40,792	47.27 %	8.75 %
12	Grifton (Lenoir)	84,745	147	147	0.17 %	100.00 %
	Hookerton	84,745	413	413	0.49 %	100.00 %
	Kinston	84,745	19,900	19,900	23.48 %	100.00 %
	La Grange	84,745	2,595	2,595	3.06 %	100.00 %
	Maysville	84,745	818	818	0.97 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
12	Pink Hill	84,745	451	451	0.53 %	100.00 %
	Pollocksville	84,745	268	268	0.32 %	100.00 %
	Snow Hill	84,745	1,481	1,481	1.75 %	100.00 %
	Trenton	84,745	238	238	0.28 %	100.00 %
	Walstonburg	84,745	193	193	0.23 %	100.00 %
13	Atlantic Beach	83,307	1,364	1,364	1.64 %	100.00 %
	Beaufort	83,307	4,464	4,464	5.36 %	100.00 %
	Bogue	83,307	695	695	0.83 %	100.00 %
	Cape Carteret	83,307	2,224	2,224	2.67 %	100.00 %
	Cedar Point	83,307	1,764	1,764	2.12 %	100.00 %
	Emerald Isle	83,307	3,847	3,847	4.62 %	100.00 %
	Havelock	83,307	16,621	10,635	12.77 %	63.99 %
	Indian Beach	83,307	223	223	0.27 %	100.00 %
	Morehead City	83,307	9,556	9,556	11.47 %	100.00 %
	Newport	83,307	4,364	4,364	5.24 %	100.00 %
	Peletier	83,307	769	769	0.92 %	100.00 %
	Pine Knoll Shores	83,307	1,388	1,388	1.67 %	100.00 %
14	Jacksonville	86,538	72,723	28,456	32.88 %	39.13 %
	Swansboro	86,538	3,744	3,744	4.33 %	100.00 %
15	Holly Ridge	87,578	4,171	4,171	4.76 %	100.00 %
	Jacksonville	87,578	72,723	44,267	50.55 %	60.87 %
	North Topsail Beach	87,578	1,005	1,005	1.15 %	100.00 %
	Surf City (Onslow)	87,578	334	334	0.38 %	100.00 %
16	Atkinson	90,663	296	296	0.33 %	100.00 %
	Burgaw	90,663	3,088	3,088	3.41 %	100.00 %
	Richlands	90,663	2,287	2,287	2.52 %	100.00 %
	St. Helena	90,663	417	417	0.46 %	100.00 %
	Surf City (Pender)	90,663	3,533	3,533	3.90 %	100.00 %
	Topsail Beach	90,663	461	461	0.51 %	100.00 %
	Wallace (Pender)	90,663	0	0	0.00 %	0.00 %
	Watha	90,663	181	181	0.20 %	100.00 %
17	Belville	89,763	2,406	2,406	2.68 %	100.00 %
	Calabash	89,763	2,011	2,011	2.24 %	100.00 %
	Carolina Shores	89,763	4,588	4,588	5.11 %	100.00 %
	Holden Beach	89,763	921	0	0.00 %	0.00 %
	Leland	89,763	22,908	22,908	25.52 %	100.00 %
	Navassa	89,763	1,367	1,367	1.52 %	100.00 %
	Northwest	89,763	703	703	0.78 %	100.00 %
	Ocean Isle Beach	89,763	867	867	0.97 %	100.00 %
	Sandy Creek	89,763	248	248	0.28 %	100.00 %
	Shallotte	89,763	4,185	4,185	4.66 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
17	Sunset Beach	89,763	4,175	4,175	4.65 %	100.00 %
18	Wilmington	91,245	115,451	48,680	53.35 %	42.17 %
19	Bald Head Island	91,041	268	268	0.29 %	100.00 %
	Boiling Spring Lakes	91,041	5,943	5,943	6.53 %	100.00 %
	Bolivia	91,041	149	149	0.16 %	100.00 %
	Carolina Beach	91,041	6,564	6,564	7.21 %	100.00 %
	Caswell Beach	91,041	395	395	0.43 %	100.00 %
	Holden Beach	91,041	921	921	1.01 %	100.00 %
	Kure Beach	91,041	2,191	2,191	2.41 %	100.00 %
	Oak Island	91,041	8,396	8,396	9.22 %	100.00 %
	Southport	91,041	3,971	3,971	4.36 %	100.00 %
	St. James	91,041	6,529	6,529	7.17 %	100.00 %
	Varnamtown	91,041	525	525	0.58 %	100.00 %
	Wilmington	91,041	115,451	8,207	9.01 %	7.11 %
20	Wilmington	90,346	115,451	58,564	64.82 %	50.73 %
	Wrightsville Beach	90,346	2,473	2,473	2.74 %	100.00 %
21	Apex	86,179	58,780	556	0.65 %	0.95 %
	Cary (Wake)	86,179	171,012	30,622	35.53 %	17.91 %
	Fuquay-Varina (Wake)	86,179	34,152	30	0.03 %	0.09 %
	Garner	86,179	31,159	11,789	13.68 %	37.83 %
	Holly Springs	86,179	41,239	11,892	13.80 %	28.84 %
	Raleigh (Wake)	86,179	466,106	13	0.02 %	0.00 %
22	Autryville	88,642	167	167	0.19 %	100.00 %
	Bladenboro	88,642	1,648	1,648	1.86 %	100.00 %
	Clarkton	88,642	614	614	0.69 %	100.00 %
	Clinton	88,642	8,383	8,383	9.46 %	100.00 %
	Dublin	88,642	267	267	0.30 %	100.00 %
	East Arcadia	88,642	418	418	0.47 %	100.00 %
	Elizabethtown	88,642	3,296	3,296	3.72 %	100.00 %
	Faison (Sampson)	88,642	0	0	0.00 %	0.00 %
	Falcon (Sampson)	88,642	0	0	0.00 %	0.00 %
	Garland	88,642	595	595	0.67 %	100.00 %
	Harrells (Sampson)	88,642	160	160	0.18 %	100.00 %
	Newton Grove	88,642	585	585	0.66 %	100.00 %
	Roseboro	88,642	1,163	1,163	1.31 %	100.00 %
	Salemburg	88,642	457	457	0.52 %	100.00 %
	Tar Heel	88,642	90	90	0.10 %	100.00 %
	Turkey	88,642	213	213	0.24 %	100.00 %
	White Lake	88,642	843	843	0.95 %	100.00 %
23	Askewville	88,865	184	184	0.21 %	100.00 %
	Aulander	88,865	763	763	0.86 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
23	Bear Grass	88,865	89	89	0.10 %	100.00 %
	Colerain	88,865	217	217	0.24 %	100.00 %
	Conetoe	88,865	198	198	0.22 %	100.00 %
	Everetts	88,865	150	150	0.17 %	100.00 %
	Hamilton	88,865	306	306	0.34 %	100.00 %
	Hassell	88,865	49	49	0.06 %	100.00 %
	Jamesville	88,865	424	424	0.48 %	100.00 %
	Kelford	88,865	203	203	0.23 %	100.00 %
	Leggett	88,865	37	37	0.04 %	100.00 %
	Lewiston Woodville	88,865	426	426	0.48 %	100.00 %
	Macclesfield	88,865	413	413	0.46 %	100.00 %
	Oak City	88,865	266	266	0.30 %	100.00 %
	Parmele	88,865	243	243	0.27 %	100.00 %
	Pinetops	88,865	1,200	1,200	1.35 %	100.00 %
	Powellsville	88,865	189	189	0.21 %	100.00 %
	Princeville	88,865	1,254	1,254	1.41 %	100.00 %
	Robersonville	88,865	1,269	1,269	1.43 %	100.00 %
	Rocky Mount (Edgecombe)	88,865	15,414	15,414	17.35 %	100.00 %
	Roxobel	88,865	187	187	0.21 %	100.00 %
	Sharpsburg (Edgecombe)	88,865	215	215	0.24 %	100.00 %
	Speed	88,865	63	63	0.07 %	100.00 %
	Tarboro	88,865	10,721	10,721	12.06 %	100.00 %
	Whitakers (Edgecombe)	88,865	290	290	0.33 %	100.00 %
	Williamston	88,865	5,248	5,248	5.91 %	100.00 %
	Windsor	88,865	3,582	3,582	4.03 %	100.00 %
24	Bailey	87,220	568	568	0.65 %	100.00 %
	Black Creek	87,220	692	692	0.79 %	100.00 %
	Elm City (Wilson)	87,220	1,218	1,218	1.40 %	100.00 %
	Kenly (Wilson)	87,220	198	198	0.23 %	100.00 %
	Lucama	87,220	1,036	1,036	1.19 %	100.00 %
	Middlesex	87,220	912	912	1.05 %	100.00 %
	Saratoga	87,220	353	353	0.40 %	100.00 %
	Sharpsburg (Wilson)	87,220	421	421	0.48 %	100.00 %
	Sims	87,220	275	275	0.32 %	100.00 %
	Stantonsburg	87,220	762	762	0.87 %	100.00 %
	Wilson	87,220	47,851	47,851	54.86 %	100.00 %
25	Castalia	86,534	264	264	0.31 %	100.00 %
	Dortches	86,534	1,082	1,082	1.25 %	100.00 %
	Elm City (Nash)	86,534	0	0	0.00 %	0.00 %
	Momeyer	86,534	277	277	0.32 %	100.00 %
	Nashville	86,534	5,632	5,632	6.51 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
25	Red Oak	86,534	3,342	3,342	3.86 %	100.00 %
	Rocky Mount (Nash)	86,534	38,927	38,927	44.98 %	100.00 %
	Sharpsburg (Nash)	86,534	1,061	1,061	1.23 %	100.00 %
	Spring Hope	86,534	1,309	1,309	1.51 %	100.00 %
	Whitakers (Nash)	86,534	337	337	0.39 %	100.00 %
26	Archer Lodge	89,947	4,797	4,797	5.33 %	100.00 %
	Clayton (Johnston)	89,947	26,307	26,307	29.25 %	100.00 %
	Wilson's Mills	89,947	2,534	0	0.00 %	0.00 %
	Zebulon (Johnston)	89,947	0	0	0.00 %	0.00 %
27	Conway	84,735	752	752	0.89 %	100.00 %
	Enfield	84,735	1,865	1,865	2.20 %	100.00 %
	Garysburg	84,735	904	904	1.07 %	100.00 %
	Gaston	84,735	1,008	1,008	1.19 %	100.00 %
	Halifax	84,735	170	170	0.20 %	100.00 %
	Hobgood	84,735	268	268	0.32 %	100.00 %
	Jackson	84,735	430	430	0.51 %	100.00 %
	Lasker	84,735	64	64	0.08 %	100.00 %
	Littleton	84,735	559	559	0.66 %	100.00 %
	Macon	84,735	110	110	0.13 %	100.00 %
	Norlina	84,735	920	920	1.09 %	100.00 %
	Rich Square	84,735	894	894	1.06 %	100.00 %
	Roanoke Rapids	84,735	15,229	15,229	17.97 %	100.00 %
	Scotland Neck	84,735	1,640	1,640	1.94 %	100.00 %
	Seaboard	84,735	542	542	0.64 %	100.00 %
	Severn	84,735	191	191	0.23 %	100.00 %
	Warrenton	84,735	851	851	1.00 %	100.00 %
	Weldon	84,735	1,444	1,444	1.70 %	100.00 %
	Woodland	84,735	557	557	0.66 %	100.00 %
28	Benson (Johnston)	85,389	3,967	3,967	4.65 %	100.00 %
	Four Oaks	85,389	2,158	2,158	2.53 %	100.00 %
	Kenly (Johnston)	85,389	1,293	1,293	1.51 %	100.00 %
	Micro	85,389	458	458	0.54 %	100.00 %
	Pine Level	85,389	2,046	2,046	2.40 %	100.00 %
	Princeton	85,389	1,315	1,315	1.54 %	100.00 %
	Selma	85,389	6,317	6,317	7.40 %	100.00 %
	Smithfield	85,389	11,292	11,292	13.22 %	100.00 %
	Wilson's Mills	85,389	2,534	2,534	2.97 %	100.00 %
29	Chapel Hill (Durham)	91,212	2,906	2,906	3.19 %	100.00 %
	Durham (Durham)	91,212	283,093	87,035	95.42 %	30.74 %
30	Durham (Durham)	91,165	283,093	89,671	98.36 %	31.68 %
31	Durham (Durham)	90,760	283,093	81,220	89.49 %	28.69 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
31	Morrisville (Durham)	90,760	207	207	0.23 %	100.00 %
	Raleigh (Durham)	90,760	1,559	233	0.26 %	14.95 %
32	Butner	88,633	8,397	8,397	9.47 %	100.00 %
	Creedmoor	88,633	4,866	2,801	3.16 %	57.56 %
	Henderson	88,633	15,060	15,060	16.99 %	100.00 %
	Kittrell	88,633	132	132	0.15 %	100.00 %
	Middleburg	88,633	101	101	0.11 %	100.00 %
	Oxford	88,633	8,628	8,628	9.73 %	100.00 %
	Stem	88,633	960	960	1.08 %	100.00 %
	Stovall	88,633	324	324	0.37 %	100.00 %
33	Garner	83,049	31,159	14	0.02 %	0.04 %
	Raleigh (Wake)	83,049	466,106	82,480	99.31 %	17.70 %
34	Raleigh (Wake)	83,679	466,106	83,503	99.79 %	17.92 %
35	Raleigh (Wake)	88,374	466,106	6,171	6.98 %	1.32 %
	Rolesville	88,374	9,475	9,467	10.71 %	99.92 %
	Wake Forest (Wake)	88,374	46,097	46,097	52.16 %	100.00 %
36	Apex	90,166	58,780	57,843	64.15 %	98.41 %
	Cary (Wake)	90,166	171,012	0	0.00 %	0.00 %
	Fuquay-Varina (Wake)	90,166	34,152	16	0.02 %	0.05 %
	Holly Springs	90,166	41,239	17,734	19.67 %	43.00 %
37	Angier (Wake)	90,867	556	556	0.61 %	100.00 %
	Cary (Wake)	90,867	171,012	2,012	2.21 %	1.18 %
	Fuquay-Varina (Wake)	90,867	34,152	34,106	37.53 %	99.87 %
	Garner	90,867	31,159	0	0.00 %	0.00 %
	Holly Springs	90,867	41,239	11,613	12.78 %	28.16 %
38	Clayton (Wake)	88,226	0	0	0.00 %	0.00 %
	Garner	88,226	31,159	19,356	21.94 %	62.12 %
	Knightdale	88,226	19,435	0	0.00 %	0.00 %
	Raleigh (Wake)	88,226	466,106	56,840	64.43 %	12.19 %
39	Clayton (Wake)	90,164	0	0	0.00 %	0.00 %
	Knightdale	90,164	19,435	19,435	21.56 %	100.00 %
	Raleigh (Wake)	90,164	466,106	13,011	14.43 %	2.79 %
	Rolesville	90,164	9,475	8	0.01 %	0.08 %
	Wendell	90,164	9,793	9,793	10.86 %	100.00 %
	Zebulon (Wake)	90,164	6,903	6,903	7.66 %	100.00 %
40	Durham (Wake)	83,175	269	269	0.32 %	100.00 %
	Raleigh (Wake)	83,175	466,106	57,345	68.94 %	12.30 %
41	Apex	89,887	58,780	381	0.42 %	0.65 %
	Cary (Wake)	89,887	171,012	74,074	82.41 %	43.32 %
	Morrisville (Wake)	89,887	29,423	14,239	15.84 %	48.39 %
42	Fayetteville	85,537	208,501	65,401	76.46 %	31.37 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
42	Spring Lake	85,537	11,660	11,660	13.63 %	100.00 %
43	Eastover	82,956	3,656	3,656	4.41 %	100.00 %
	Falcon (Cumberland)	82,956	324	324	0.39 %	100.00 %
	Fayetteville	82,956	208,501	44,532	53.68 %	21.36 %
	Godwin	82,956	128	128	0.15 %	100.00 %
	Hope Mills	82,956	17,808	64	0.08 %	0.36 %
	Linden	82,956	136	136	0.16 %	100.00 %
	Stedman	82,956	1,277	1,277	1.54 %	100.00 %
	Wade	82,956	638	638	0.77 %	100.00 %
44	Fayetteville	83,297	208,501	83,293	100.00 %	39.95 %
45	Fayetteville	82,938	208,501	15,275	18.42 %	7.33 %
	Hope Mills	82,938	17,808	17,744	21.39 %	99.64 %
46	Boardman	83,445	166	166	0.20 %	100.00 %
	Bolton	83,445	519	519	0.62 %	100.00 %
	Brunswick	83,445	973	973	1.17 %	100.00 %
	Cerro Gordo	83,445	131	131	0.16 %	100.00 %
	Chadbourn	83,445	1,574	1,574	1.89 %	100.00 %
	Fair Bluff	83,445	709	709	0.85 %	100.00 %
	Fairmont	83,445	2,191	2,191	2.63 %	100.00 %
	Lake Waccamaw	83,445	1,296	1,296	1.55 %	100.00 %
	Lumberton	83,445	19,025	350	0.42 %	1.84 %
	Marietta	83,445	111	111	0.13 %	100.00 %
	Maxton (Robeson)	83,445	1,902	1,902	2.28 %	100.00 %
	McDonald	83,445	94	94	0.11 %	100.00 %
	Orrum	83,445	59	59	0.07 %	100.00 %
	Proctorville	83,445	121	121	0.15 %	100.00 %
	Raynham	83,445	60	60	0.07 %	100.00 %
	Rowland	83,445	885	885	1.06 %	100.00 %
	Sandyfield	83,445	430	430	0.52 %	100.00 %
	Tabor City	83,445	3,781	3,781	4.53 %	100.00 %
	Whiteville	83,445	4,766	4,766	5.71 %	100.00 %
47	Fairmont	83,708	2,191	0	0.00 %	0.00 %
	Lumber Bridge	83,708	82	82	0.10 %	100.00 %
	Lumberton	83,708	19,025	18,675	22.31 %	98.16 %
	Parkton	83,708	504	504	0.60 %	100.00 %
	Pembroke	83,708	2,823	2,823	3.37 %	100.00 %
	Red Springs (Robeson)	83,708	3,087	3,087	3.69 %	100.00 %
	Rennert	83,708	275	275	0.33 %	100.00 %
	St. Pauls	83,708	2,045	2,045	2.44 %	100.00 %
48	East Laurinburg	86,256	234	234	0.27 %	100.00 %
	Gibson	86,256	449	449	0.52 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
48	Laurinburg	86,256	14,978	14,978	17.36 %	100.00 %
	Maxton (Scotland)	86,256	208	208	0.24 %	100.00 %
	Raeford	86,256	4,559	4,559	5.29 %	100.00 %
	Red Springs (Hoke)	86,256	0	0	0.00 %	0.00 %
	Wagram	86,256	615	615	0.71 %	100.00 %
49	Cary (Wake)	86,157	171,012	20,767	24.10 %	12.14 %
	Durham (Wake)	86,157	269	0	0.00 %	0.00 %
	Morrisville (Wake)	86,157	29,423	15,184	17.62 %	51.61 %
	Raleigh (Wake)	86,157	466,106	47,783	55.46 %	10.25 %
50	Carrboro	85,345	21,295	174	0.20 %	0.82 %
	Durham (Orange)	85,345	144	144	0.17 %	100.00 %
	Hillsborough	85,345	9,660	9,660	11.32 %	100.00 %
	Mebane (Orange)	85,345	3,171	3,171	3.72 %	100.00 %
	Milton	85,345	155	155	0.18 %	100.00 %
	Yanceyville	85,345	1,937	1,937	2.27 %	100.00 %
51	Broadway (Lee)	83,073	1,267	1,267	1.53 %	100.00 %
	Cameron	83,073	244	244	0.29 %	100.00 %
	Carthage	83,073	2,775	2,747	3.31 %	98.99 %
	Sanford	83,073	30,261	30,261	36.43 %	100.00 %
	Vass	83,073	952	952	1.15 %	100.00 %
52	Aberdeen	84,383	8,516	8,516	10.09 %	100.00 %
	Carthage	84,383	2,775	28	0.03 %	1.01 %
	Dobbins Heights	84,383	687	687	0.81 %	100.00 %
	Ellerbe	84,383	864	864	1.02 %	100.00 %
	Foxfire	84,383	1,288	0	0.00 %	0.00 %
	Hamlet	84,383	6,025	6,025	7.14 %	100.00 %
	Hoffman	84,383	418	418	0.50 %	100.00 %
	Norman	84,383	100	100	0.12 %	100.00 %
	Pinebluff	84,383	1,473	1,473	1.75 %	100.00 %
	Pinehurst	84,383	17,581	8	0.01 %	0.05 %
	Rockingham	84,383	9,243	9,243	10.95 %	100.00 %
	Southern Pines	84,383	15,545	15,545	18.42 %	100.00 %
	Taylortown	84,383	634	4	0.00 %	0.63 %
	Whispering Pines	84,383	4,987	4,987	5.91 %	100.00 %
53	Benson (Harnett)	86,899	0	0	0.00 %	0.00 %
	Coats	86,899	2,155	2,155	2.48 %	100.00 %
	Dunn	86,899	8,446	8,446	9.72 %	100.00 %
	Erwin	86,899	4,542	4,542	5.23 %	100.00 %
	Lillington	86,899	4,735	3,853	4.43 %	81.37 %
54	Cary (Chatham)	83,475	3,709	3,709	4.44 %	100.00 %
	Goldston	83,475	234	234	0.28 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
54	Liberty	83,475	2,655	2,655	3.18 %	100.00 %
	Pittsboro	83,475	4,537	4,537	5.44 %	100.00 %
	Siler City	83,475	7,702	7,702	9.23 %	100.00 %
	Staley	83,475	397	397	0.48 %	100.00 %
55	Ansonville	87,005	440	440	0.51 %	100.00 %
	Indian Trail	87,005	39,997	2,376	2.73 %	5.94 %
	Lilesville	87,005	395	395	0.45 %	100.00 %
	Marshville	87,005	2,522	2,522	2.90 %	100.00 %
	McFarlan	87,005	94	94	0.11 %	100.00 %
	Mineral Springs	87,005	3,159	2,293	2.64 %	72.59 %
	Monroe	87,005	34,562	12,650	14.54 %	36.60 %
	Morven	87,005	329	329	0.38 %	100.00 %
	Peachland	87,005	390	390	0.45 %	100.00 %
	Polkton	87,005	2,250	2,250	2.59 %	100.00 %
	Wadesboro	87,005	5,008	5,008	5.76 %	100.00 %
	Waxhaw	87,005	20,534	0	0.00 %	0.00 %
	Wesley Chapel	87,005	8,681	3,868	4.45 %	44.56 %
	Wingate	87,005	4,055	4,055	4.66 %	100.00 %
56	Carrboro	86,087	21,295	21,121	24.53 %	99.18 %
	Chapel Hill (Orange)	86,087	59,054	59,054	68.60 %	100.00 %
57	Greensboro	90,615	299,035	83,540	92.19 %	27.94 %
	Summerfield	90,615	10,951	746	0.82 %	6.81 %
58	Greensboro	90,808	299,035	84,725	93.30 %	28.33 %
59	Burlington (Guilford)	90,361	1,822	1,822	2.02 %	100.00 %
	Gibsonville (Guilford)	90,361	4,642	4,642	5.14 %	100.00 %
	Greensboro	90,361	299,035	13,852	15.33 %	4.63 %
	Pleasant Garden	90,361	5,000	5,000	5.53 %	100.00 %
	Sedalia	90,361	676	676	0.75 %	100.00 %
	Summerfield	90,361	10,951	2,509	2.78 %	22.91 %
	Whitsett	90,361	584	584	0.65 %	100.00 %
60	Archdale (Guilford)	89,735	380	380	0.42 %	100.00 %
	Greensboro	89,735	299,035	8,829	9.84 %	2.95 %
	High Point (Guilford)	89,735	107,321	66,033	73.59 %	61.53 %
	Jamestown	89,735	3,668	3,668	4.09 %	100.00 %
61	Greensboro	90,201	299,035	90,201	100.00 %	30.16 %
62	Greensboro	89,579	299,035	17,888	19.97 %	5.98 %
	High Point (Guilford)	89,579	107,321	41,288	46.09 %	38.47 %
	Kernersville (Guilford)	89,579	502	502	0.56 %	100.00 %
	Oak Ridge	89,579	7,474	7,474	8.34 %	100.00 %
	Stokesdale	89,579	5,924	5,924	6.61 %	100.00 %
	Summerfield	89,579	10,951	7,696	8.59 %	70.28 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
63	Burlington (Alamance)	86,399	55,481	25,917	30.00 %	46.71 %
	Graham	86,399	17,157	17,157	19.86 %	100.00 %
	Green Level	86,399	3,152	3,152	3.65 %	100.00 %
	Haw River	86,399	2,252	2,252	2.61 %	100.00 %
	Mebane (Alamance)	86,399	14,626	14,626	16.93 %	100.00 %
	Swepsonville	86,399	2,445	2,445	2.83 %	100.00 %
64	Alamance	85,016	988	988	1.16 %	100.00 %
	Burlington (Alamance)	85,016	55,481	29,564	34.77 %	53.29 %
	Elon	85,016	11,336	11,336	13.33 %	100.00 %
	Gibsonville (Alamance)	85,016	4,278	4,278	5.03 %	100.00 %
	Ossipee	85,016	536	536	0.63 %	100.00 %
65	Eden	91,096	15,421	15,421	16.93 %	100.00 %
	Madison	91,096	2,129	2,129	2.34 %	100.00 %
	Mayodan	91,096	2,418	2,418	2.65 %	100.00 %
	Reidsville	91,096	14,583	14,583	16.01 %	100.00 %
	Stoneville	91,096	1,308	1,308	1.44 %	100.00 %
	Wentworth	91,096	2,662	2,662	2.92 %	100.00 %
66	Raleigh (Wake)	83,189	466,106	78,168	93.96 %	16.77 %
	Wake Forest (Wake)	83,189	46,097	0	0.00 %	0.00 %
67	Albemarle	88,255	16,432	16,432	18.62 %	100.00 %
	Badin	88,255	2,024	2,024	2.29 %	100.00 %
	Biscoe	88,255	1,848	1,848	2.09 %	100.00 %
	Candor (Montgomery)	88,255	813	813	0.92 %	100.00 %
	Locust (Stanly)	88,255	3,996	3,996	4.53 %	100.00 %
	Misenheimer	88,255	650	650	0.74 %	100.00 %
	Mount Gilead	88,255	1,171	1,171	1.33 %	100.00 %
	New London	88,255	607	607	0.69 %	100.00 %
	Norwood	88,255	2,367	2,367	2.68 %	100.00 %
	Oakboro	88,255	2,128	2,128	2.41 %	100.00 %
	Red Cross	88,255	762	762	0.86 %	100.00 %
	Richfield	88,255	582	582	0.66 %	100.00 %
	Stanfield	88,255	1,585	1,585	1.80 %	100.00 %
	Star	88,255	806	806	0.91 %	100.00 %
	Troy	88,255	2,850	2,850	3.23 %	100.00 %
68	Indian Trail	88,138	39,997	15,036	17.06 %	37.59 %
	Marvin	88,138	6,358	6,358	7.21 %	100.00 %
	Mineral Springs	88,138	3,159	866	0.98 %	27.41 %
	Stallings (Union)	88,138	15,728	0	0.00 %	0.00 %
	Waxhaw	88,138	20,534	20,534	23.30 %	100.00 %
	Weddington (Union)	88,138	13,176	13,172	14.94 %	99.97 %
	Wesley Chapel	88,138	8,681	4,813	5.46 %	55.44 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
69	Fairview	85,179	3,456	3,456	4.06 %	100.00 %
	Hemby Bridge	85,179	1,614	1,614	1.89 %	100.00 %
	Indian Trail	85,179	39,997	22,585	26.51 %	56.47 %
	Lake Park	85,179	3,269	3,269	3.84 %	100.00 %
	Mint Hill (Union)	85,179	6	6	0.01 %	100.00 %
	Monroe	85,179	34,562	21,912	25.72 %	63.40 %
	Stallings (Union)	85,179	15,728	15,728	18.46 %	100.00 %
	Unionville	85,179	6,643	6,643	7.80 %	100.00 %
	Weddington (Union)	85,179	13,176	4	0.00 %	0.03 %
70	Archdale (Randolph)	89,118	11,527	11,527	12.93 %	100.00 %
	Asheboro	89,118	27,156	25,890	29.05 %	95.34 %
	High Point (Randolph)	89,118	8	8	0.01 %	100.00 %
	Randleman	89,118	4,595	4,595	5.16 %	100.00 %
	Thomasville (Randolph)	89,118	521	521	0.58 %	100.00 %
	Trinity	89,118	7,006	7,006	7.86 %	100.00 %
71	Kernersville (Forsyth)	84,874	25,947	0	0.00 %	0.00 %
	Walkertown	84,874	5,692	3,176	3.74 %	55.80 %
	Winston-Salem	84,874	249,545	77,631	91.47 %	31.11 %
72	Winston-Salem	86,949	249,545	86,867	99.91 %	34.81 %
73	Concord	90,649	105,240	32,447	35.79 %	30.83 %
	Harrisburg	90,649	18,967	18,967	20.92 %	100.00 %
	Locust (Cabarrus)	90,649	541	541	0.60 %	100.00 %
	Midland (Cabarrus)	90,649	4,684	4,684	5.17 %	100.00 %
	Mount Pleasant	90,649	1,671	1,671	1.84 %	100.00 %
74	Bethania	84,857	344	0	0.00 %	0.00 %
	Clemmons	84,857	21,163	21,163	24.94 %	100.00 %
	Lewisville	84,857	13,381	13,381	15.77 %	100.00 %
	Tobaccoville (Forsyth)	84,857	2,578	824	0.97 %	31.96 %
	Winston-Salem	84,857	249,545	32,409	38.19 %	12.99 %
75	High Point (Forsyth)	84,220	84	84	0.10 %	100.00 %
	Kernersville (Forsyth)	84,220	25,947	25,947	30.81 %	100.00 %
	Walkertown	84,220	5,692	2,516	2.99 %	44.20 %
	Winston-Salem	84,220	249,545	22,818	27.09 %	9.14 %
76	East Spencer	89,815	1,567	1,567	1.74 %	100.00 %
	Faith	89,815	819	819	0.91 %	100.00 %
	Granite Quarry	89,815	2,984	2,984	3.32 %	100.00 %
	Rockwell	89,815	2,302	2,302	2.56 %	100.00 %
	Salisbury	89,815	35,540	35,540	39.57 %	100.00 %
	Spencer	89,815	3,308	3,308	3.68 %	100.00 %
77	Bermuda Run	90,628	3,120	3,120	3.44 %	100.00 %
	Boonville	90,628	1,185	1,185	1.31 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
77	Cleveland	90,628	846	846	0.93 %	100.00 %
	Cooleemee	90,628	940	940	1.04 %	100.00 %
	East Bend	90,628	634	634	0.70 %	100.00 %
	Jonesville	90,628	2,308	2,308	2.55 %	100.00 %
	Mocksville	90,628	5,900	5,900	6.51 %	100.00 %
	Yadkinville	90,628	2,995	2,995	3.30 %	100.00 %
78	Aberdeen	86,365	8,516	0	0.00 %	0.00 %
	Asheboro	86,365	27,156	1,266	1.47 %	4.66 %
	Candor (Moore)	86,365	0	0	0.00 %	0.00 %
	Foxfire	86,365	1,288	1,288	1.49 %	100.00 %
	Franklinville	86,365	1,197	1,197	1.39 %	100.00 %
	Pinehurst	86,365	17,581	17,573	20.35 %	99.95 %
	Ramseur	86,365	1,774	1,774	2.05 %	100.00 %
	Robbins	86,365	1,168	1,168	1.35 %	100.00 %
	Seagrove	86,365	235	235	0.27 %	100.00 %
	Southern Pines	86,365	15,545	0	0.00 %	0.00 %
	Taylortown	86,365	634	630	0.73 %	99.37 %
79	Alliance	83,163	733	733	0.88 %	100.00 %
	Arapahoe	83,163	416	416	0.50 %	100.00 %
	Aurora	83,163	455	455	0.55 %	100.00 %
	Bath	83,163	245	245	0.29 %	100.00 %
	Bayboro	83,163	1,161	1,161	1.40 %	100.00 %
	Belhaven	83,163	1,410	1,410	1.70 %	100.00 %
	Chocowinity	83,163	722	722	0.87 %	100.00 %
	Grantsboro	83,163	692	692	0.83 %	100.00 %
	Kill Devil Hills	83,163	7,656	538	0.65 %	7.03 %
	Manteo	83,163	1,600	1,600	1.92 %	100.00 %
	Mesic	83,163	144	144	0.17 %	100.00 %
	Minnesott Beach	83,163	530	530	0.64 %	100.00 %
	Nags Head	83,163	3,168	3,168	3.81 %	100.00 %
	Oriental	83,163	880	880	1.06 %	100.00 %
	Pantego	83,163	164	164	0.20 %	100.00 %
	Stonewall	83,163	214	214	0.26 %	100.00 %
	Vandemere	83,163	246	246	0.30 %	100.00 %
	Washington	83,163	9,875	9,875	11.87 %	100.00 %
	Washington Park	83,163	392	392	0.47 %	100.00 %
80	Denton	84,864	1,494	1,494	1.76 %	100.00 %
	High Point (Davidson)	84,864	6,646	6,646	7.83 %	100.00 %
	Lexington	84,864	19,632	0	0.00 %	0.00 %
	Midway	84,864	4,742	3,469	4.09 %	73.15 %
	Thomasville (Davidson)	84,864	26,662	26,662	31.42 %	100.00 %

PEGDEN 5

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
80	Wallburg	84,864	3,051	3,051	3.60 %	100.00 %
81	Lexington	84,066	19,632	19,632	23.35 %	100.00 %
	Midway	84,066	4,742	1,273	1.51 %	26.85 %
82	Concord	90,771	105,240	48,723	53.68 %	46.30 %
	Kannapolis (Cabarrus)	90,771	42,846	33,907	37.35 %	79.14 %
83	China Grove	90,742	4,434	4,434	4.89 %	100.00 %
	Concord	90,742	105,240	24,070	26.53 %	22.87 %
	Kannapolis (Cabarrus)	90,742	42,846	8,939	9.85 %	20.86 %
	Kannapolis (Rowan)	90,742	10,268	10,268	11.32 %	100.00 %
	Landis	90,742	3,690	3,690	4.07 %	100.00 %
84	Harmony	86,773	543	543	0.63 %	100.00 %
	Love Valley	86,773	154	154	0.18 %	100.00 %
	Mooresville	86,773	50,193	205	0.24 %	0.41 %
	Statesville	86,773	28,419	28,415	32.75 %	99.99 %
	Troutman	86,773	3,698	885	1.02 %	23.93 %
85	Bakersville	90,863	450	450	0.50 %	100.00 %
	Banner Elk	90,863	1,049	1,049	1.15 %	100.00 %
	Beech Mountain (Avery)	90,863	62	62	0.07 %	100.00 %
	Burnsville	90,863	1,614	1,614	1.78 %	100.00 %
	Crossnore	90,863	143	143	0.16 %	100.00 %
	Elk Park	90,863	542	542	0.60 %	100.00 %
	Grandfather Village	90,863	95	95	0.10 %	100.00 %
	Marion	90,863	7,717	7,717	8.49 %	100.00 %
	Newland	90,863	715	715	0.79 %	100.00 %
	Old Fort	90,863	811	811	0.89 %	100.00 %
	Seven Devils (Avery)	90,863	38	38	0.04 %	100.00 %
	Spruce Pine	90,863	2,194	2,194	2.41 %	100.00 %
	Sugar Mountain	90,863	371	371	0.41 %	100.00 %
86	Connelly Springs	87,570	1,529	1,529	1.75 %	100.00 %
	Drexel	87,570	1,760	1,760	2.01 %	100.00 %
	Glen Alpine	87,570	1,529	1,529	1.75 %	100.00 %
	Hickory (Burke)	87,570	79	79	0.09 %	100.00 %
	Hildebran	87,570	1,679	1,679	1.92 %	100.00 %
	Long View (Burke)	87,570	735	735	0.84 %	100.00 %
	Morganton	87,570	17,474	17,474	19.95 %	100.00 %
	Rhodhiss (Burke)	87,570	639	639	0.73 %	100.00 %
	Rutherford College (Burke)	87,570	1,226	1,226	1.40 %	100.00 %
	Valdese	87,570	4,689	4,689	5.35 %	100.00 %
87	Blowing Rock (Caldwell)	85,758	91	91	0.11 %	100.00 %
	Blowing Rock (Watauga)	85,758	1,285	5	0.01 %	0.39 %
	Boone	85,758	19,092	595	0.69 %	3.12 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
87	Cajah's Mountain	85,758	2,722	2,722	3.17 %	100.00 %
	Cedar Rock	85,758	301	301	0.35 %	100.00 %
	Gamewell	85,758	3,702	3,702	4.32 %	100.00 %
	Granite Falls	85,758	4,965	4,965	5.79 %	100.00 %
	Hickory (Caldwell)	85,758	32	32	0.04 %	100.00 %
	Hudson	85,758	3,780	3,780	4.41 %	100.00 %
	Lenoir	85,758	18,352	18,352	21.40 %	100.00 %
	Rhodhiss (Caldwell)	85,758	358	358	0.42 %	100.00 %
	Rutherford College (Caldwell)	85,758	0	0	0.00 %	0.00 %
	Sawmills	85,758	5,020	5,020	5.85 %	100.00 %
88	Charlotte	82,834	874,579	82,834	100.00 %	9.47 %
89	Catawba	85,577	702	702	0.82 %	100.00 %
	Claremont	85,577	1,692	1,692	1.98 %	100.00 %
	Conover	85,577	8,421	424	0.50 %	5.04 %
	Hickory (Catawba)	85,577	43,379	0	0.00 %	0.00 %
	Maiden (Catawba)	85,577	3,736	3,736	4.37 %	100.00 %
	Newton	85,577	13,148	13,148	15.36 %	100.00 %
	Statesville	85,577	28,419	4	0.00 %	0.01 %
	Troutman	85,577	3,698	2,813	3.29 %	76.07 %
90	Dobson	82,937	1,462	1,462	1.76 %	100.00 %
	Elkin (Surry)	82,937	4,049	4,049	4.88 %	100.00 %
	Elkin (Wilkes)	82,937	73	73	0.09 %	100.00 %
	Mount Airy	82,937	10,676	10,676	12.87 %	100.00 %
	Pilot Mountain	82,937	1,440	1,440	1.74 %	100.00 %
	Ronda	82,937	438	438	0.53 %	100.00 %
91	Bethania	86,210	344	344	0.40 %	100.00 %
	Danbury	86,210	189	189	0.22 %	100.00 %
	King (Forsyth)	86,210	591	591	0.69 %	100.00 %
	King (Stokes)	86,210	6,606	6,606	7.66 %	100.00 %
	Rural Hall	86,210	3,351	3,351	3.89 %	100.00 %
	Tobaccoville (Forsyth)	86,210	2,578	1,754	2.03 %	68.04 %
	Tobaccoville (Stokes)	86,210	0	0	0.00 %	0.00 %
	Walnut Cove	86,210	1,586	1,586	1.84 %	100.00 %
	Winston-Salem	86,210	249,545	29,820	34.59 %	11.95 %
92	Charlotte	85,031	874,579	63,762	74.99 %	7.29 %
93	Beech Mountain (Watauga)	86,445	613	613	0.71 %	100.00 %
	Blowing Rock (Watauga)	86,445	1,285	1,280	1.48 %	99.61 %
	Boone	86,445	19,092	18,497	21.40 %	96.88 %
	Jefferson	86,445	1,622	1,622	1.88 %	100.00 %
	Lansing	86,445	126	126	0.15 %	100.00 %
	Seven Devils (Watauga)	86,445	275	275	0.32 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
93	Sparta	86,445	1,834	1,834	2.12 %	100.00 %
	West Jefferson	86,445	1,279	1,279	1.48 %	100.00 %
94	North Wilkesboro	90,835	4,382	4,382	4.82 %	100.00 %
	Taylorsville	90,835	2,320	2,320	2.55 %	100.00 %
	Wilkesboro	90,835	3,687	3,687	4.06 %	100.00 %
95	Davidson (Iredell)	85,366	378	378	0.44 %	100.00 %
	Mooresville	85,366	50,193	49,988	58.56 %	99.59 %
96	Brookford	89,587	442	442	0.49 %	100.00 %
	Conover	89,587	8,421	7,997	8.93 %	94.96 %
	Hickory (Catawba)	89,587	43,379	43,379	48.42 %	100.00 %
	Long View (Catawba)	89,587	4,353	4,353	4.86 %	100.00 %
	Newton	89,587	13,148	0	0.00 %	0.00 %
97	Lincolnton	86,810	11,091	11,091	12.78 %	100.00 %
	Maiden (Lincoln)	86,810	0	0	0.00 %	0.00 %
98	Cornelius	86,827	31,412	31,412	36.18 %	100.00 %
	Davidson (Mecklenburg)	86,827	14,728	14,728	16.96 %	100.00 %
	Huntersville	86,827	61,376	38,677	44.54 %	63.02 %
99	Charlotte	87,647	874,579	79,113	90.26 %	9.05 %
	Mint Hill (Mecklenburg)	87,647	26,444	0	0.00 %	0.00 %
100	Charlotte	87,197	874,579	87,197	100.00 %	9.97 %
101	Charlotte	86,426	874,579	64,526	74.66 %	7.38 %
	Huntersville	86,426	61,376	5,893	6.82 %	9.60 %
102	Charlotte	86,179	874,579	86,179	100.00 %	9.85 %
103	Charlotte	87,132	874,579	23,590	27.07 %	2.70 %
	Matthews	87,132	29,435	29,435	33.78 %	100.00 %
	Midland (Mecklenburg)	87,132	0	0	0.00 %	0.00 %
	Mint Hill (Mecklenburg)	87,132	26,444	26,444	30.35 %	100.00 %
	Stallings (Mecklenburg)	87,132	384	384	0.44 %	100.00 %
	Weddington (Mecklenburg)	87,132	5	5	0.01 %	100.00 %
104	Charlotte	86,520	874,579	86,520	100.00 %	9.89 %
105	Charlotte	85,822	874,579	71,156	82.91 %	8.14 %
	Pineville	85,822	10,602	10,602	12.35 %	100.00 %
106	Charlotte	82,824	874,579	79,717	96.25 %	9.11 %
107	Charlotte	88,237	874,579	67,298	76.27 %	7.69 %
	Huntersville	88,237	61,376	16,806	19.05 %	27.38 %
108	Belmont	86,263	15,010	1,868	2.17 %	12.45 %
	Cramerton	86,263	5,296	96	0.11 %	1.81 %
	Gastonia	86,263	80,411	28,480	33.02 %	35.42 %
	Lowell	86,263	3,654	3,654	4.24 %	100.00 %
	McAdenville	86,263	890	890	1.03 %	100.00 %
	Mount Holly	86,263	17,703	17,703	20.52 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
108	Ranlo	86,263	4,511	4,500	5.22 %	99.76 %
	Spencer Mountain	86,263	0	0	0.00 %	0.00 %
	Stanley	86,263	3,963	3,963	4.59 %	100.00 %
109	Belmont	87,762	15,010	13,142	14.97 %	87.55 %
	Cramerton	87,762	5,296	5,200	5.93 %	98.19 %
	Gastonia	87,762	80,411	44,448	50.65 %	55.28 %
	Lowell	87,762	3,654	0	0.00 %	0.00 %
110	Belwood	88,397	857	857	0.97 %	100.00 %
	Bessemer City	88,397	5,428	5,428	6.14 %	100.00 %
	Casar	88,397	305	305	0.35 %	100.00 %
	Cherryville	88,397	6,078	6,078	6.88 %	100.00 %
	Dallas	88,397	5,927	5,927	6.70 %	100.00 %
	Dellview	88,397	6	6	0.01 %	100.00 %
	Fallston	88,397	627	627	0.71 %	100.00 %
	Gastonia	88,397	80,411	7,483	8.47 %	9.31 %
	High Shoals	88,397	595	595	0.67 %	100.00 %
	Kings Mountain (Cleveland)	88,397	10,032	8	0.01 %	0.08 %
	Kings Mountain (Gaston)	88,397	1,110	1,110	1.26 %	100.00 %
	Kingstown	88,397	656	656	0.74 %	100.00 %
	Lawndale	88,397	570	570	0.64 %	100.00 %
	Polkville	88,397	516	516	0.58 %	100.00 %
	Ranlo	88,397	4,511	11	0.01 %	0.24 %
	Shelby	88,397	21,918	4,409	4.99 %	20.12 %
	Waco	88,397	310	310	0.35 %	100.00 %
111	Boiling Springs	89,894	4,615	4,615	5.13 %	100.00 %
	Bostic	89,894	355	355	0.39 %	100.00 %
	Earl	89,894	198	198	0.22 %	100.00 %
	Ellenboro	89,894	723	723	0.80 %	100.00 %
	Forest City	89,894	7,377	0	0.00 %	0.00 %
	Grover	89,894	802	802	0.89 %	100.00 %
	Kings Mountain (Cleveland)	89,894	10,032	10,024	11.15 %	99.92 %
	Lattimore	89,894	406	406	0.45 %	100.00 %
	Mooresboro	89,894	293	293	0.33 %	100.00 %
	Patterson Springs	89,894	571	571	0.64 %	100.00 %
	Shelby	89,894	21,918	17,509	19.48 %	79.88 %
112	Charlotte	82,806	874,579	82,687	99.86 %	9.45 %
	Pineville	82,806	10,602	0	0.00 %	0.00 %
113	Chimney Rock Village	89,058	140	140	0.16 %	100.00 %
	Columbus	89,058	1,060	1,060	1.19 %	100.00 %
	Flat Rock	89,058	3,486	3,486	3.91 %	100.00 %
	Forest City	89,058	7,377	7,377	8.28 %	100.00 %

PEGDEN 5

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
113	Hendersonville	89,058	15,137	623	0.70 %	4.12 %
	Lake Lure	89,058	1,365	1,365	1.53 %	100.00 %
	Laurel Park	89,058	2,250	0	0.00 %	0.00 %
	Ruth	89,058	347	347	0.39 %	100.00 %
	Rutherfordton	89,058	3,640	3,640	4.09 %	100.00 %
	Saluda (Henderson)	89,058	11	11	0.01 %	100.00 %
	Saluda (Polk)	89,058	620	620	0.70 %	100.00 %
	Spindale	89,058	4,225	4,225	4.74 %	100.00 %
	Tryon	89,058	1,562	1,562	1.75 %	100.00 %
114	Asheville	89,685	94,589	52,596	58.65 %	55.60 %
	Weaverville	89,685	4,567	4,567	5.09 %	100.00 %
	Woodfin	89,685	7,936	7,648	8.53 %	96.37 %
115	Asheville	90,262	94,589	29,236	32.39 %	30.91 %
	Black Mountain	90,262	8,426	8,426	9.34 %	100.00 %
	Montreat	90,262	901	901	1.00 %	100.00 %
116	Asheville	89,505	94,589	12,757	14.25 %	13.49 %
	Biltmore Forest	89,505	1,409	1,409	1.57 %	100.00 %
	Woodfin	89,505	7,936	288	0.32 %	3.63 %
117	Fletcher	91,035	7,987	7,987	8.77 %	100.00 %
	Hendersonville	91,035	15,137	14,514	15.94 %	95.88 %
	Laurel Park	91,035	2,250	2,250	2.47 %	100.00 %
	Mills River	91,035	7,078	7,078	7.78 %	100.00 %
118	Canton	83,282	4,422	4,422	5.31 %	100.00 %
	Clyde	83,282	1,368	1,368	1.64 %	100.00 %
	Hot Springs	83,282	520	520	0.62 %	100.00 %
	Maggie Valley	83,282	1,687	1,687	2.03 %	100.00 %
	Mars Hill	83,282	2,007	2,007	2.41 %	100.00 %
	Marshall	83,282	777	777	0.93 %	100.00 %
	Waynesville	83,282	10,140	10,140	12.18 %	100.00 %
119	Brevard	90,212	7,744	7,744	8.58 %	100.00 %
	Bryson City	90,212	1,558	1,558	1.73 %	100.00 %
	Dillsboro	90,212	213	213	0.24 %	100.00 %
	Forest Hills	90,212	303	303	0.34 %	100.00 %
	Highlands (Jackson)	90,212	12	12	0.01 %	100.00 %
	Rosman	90,212	701	701	0.78 %	100.00 %
	Sylva	90,212	2,578	2,578	2.86 %	100.00 %
	Webster	90,212	372	372	0.41 %	100.00 %
120	Andrews	84,907	1,667	1,667	1.96 %	100.00 %
	Fontana Dam	84,907	13	13	0.02 %	100.00 %
	Franklin	84,907	4,175	4,175	4.92 %	100.00 %
	Hayesville	84,907	461	461	0.54 %	100.00 %

PEGDEN 5

NC General Assembly

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
120	Highlands (Macon)	84,907	1,060	1,060	1.25 %	100.00 %
	Lake Santeetlah	84,907	38	38	0.04 %	100.00 %
	Murphy	84,907	1,608	1,608	1.89 %	100.00 %
	Robbinsville	84,907	597	597	0.70 %	100.00 %
			Total:	**6,017,605**		

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
1	Chowan	6	0
	Currituck	11	0
	Dare	3	1
	Perquimans	7	0
	Tyrrell	6	0
	Washington	6	0
2	Durham	8	2
	Person	11	0
3	Craven	19	1
4	Duplin	19	0
	Wayne	7	1
5	Camden	3	0
	Gates	6	0
	Hertford	13	0
	Pasquotank	9	0
6	Harnett	6	0
7	Franklin	18	0
	Granville	2	0
8	Pitt	21	0
9	Pitt	19	0
10	Wayne	20	1
11	Wake	19	0
12	Greene	10	0
	Jones	7	0
	Lenoir	22	0
13	Carteret	28	0
	Craven	1	1
14	Onslow	10	0
15	Onslow	9	0
16	Onslow	5	0
	Pender	20	0
17	Brunswick	14	0
18	New Hanover	19	0
19	Brunswick	11	0
	New Hanover	7	0
20	New Hanover	17	0
21	Wake	16	0
22	Bladen	17	0
	Sampson	23	0
23	Bertie	12	0
	Edgecombe	21	0
	Martin	13	0

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
24	Nash	2	0
	Wilson	24	0
25	Nash	22	0
26	Johnston	12	0
27	Halifax	23	0
	Northampton	13	0
	Warren	14	0
28	Johnston	18	0
29	Durham	21	1
30	Durham	17	1
31	Durham	8	2
32	Granville	13	0
	Vance	12	0
33	Wake	19	0
34	Wake	24	0
35	Wake	14	0
36	Wake	12	0
37	Wake	12	0
38	Wake	13	0
39	Wake	14	0
40	Wake	20	0
41	Wake	11	0
42	Cumberland	13	0
43	Cumberland	28	0
44	Cumberland	19	0
45	Cumberland	16	0
46	Columbus	26	0
	Robeson	14	0
47	Robeson	25	0
48	Hoke	15	0
	Scotland	7	0
49	Wake	15	0
50	Caswell	9	0
	Orange	18	0
51	Lee	10	0
	Moore	4	0
52	Moore	10	0
	Richmond	16	0
53	Harnett	7	0
	Johnston	6	0
54	Chatham	18	0
	Randolph	2	0

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
55	Anson	9	0
	Union	17	0
56	Orange	23	0
57	Guilford	27	0
58	Guilford	24	0
59	Guilford	24	0
60	Guilford	27	0
61	Guilford	34	0
62	Guilford	29	0
63	Alamance	19	0
64	Alamance	18	0
65	Rockingham	15	0
66	Wake	15	0
67	Montgomery	14	0
	Stanly	22	0
68	Union	16	0
69	Union	19	0
70	Randolph	12	0
71	Forsyth	20	0
72	Forsyth	32	0
73	Cabarrus	15	0
74	Forsyth	19	0
75	Forsyth	19	0
76	Rowan	25	0
77	Davie	14	0
	Rowan	5	0
	Yadkin	12	0
78	Moore	12	0
	Randolph	8	0
79	Beaufort	21	0
	Dare	12	1
	Hyde	7	0
	Pamlico	10	0
80	Davidson	22	0
81	Davidson	21	0
82	Cabarrus	20	0
83	Cabarrus	5	0
	Rowan	11	0
84	Iredell	19	0
85	Avery	19	0
	McDowell	15	0
	Mitchell	9	0
	Yancey	11	0

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Based on TIGER 2020 VTDs
[G20-VTD-SbD] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
86	Burke	33	0
87	Caldwell	20	0
	Watauga	2	0
88	Mecklenburg	18	0
89	Catawba	17	0
	Iredell	2	0
90	Surry	24	0
	Wilkes	6	0
91	Forsyth	11	0
	Stokes	18	0
92	Mecklenburg	9	0
93	Alleghany	4	0
	Ashe	17	0
	Watauga	18	0
94	Alexander	10	0
	Wilkes	21	0
95	Iredell	8	0
96	Catawba	23	0
97	Lincoln	23	0
98	Mecklenburg	10	1
99	Mecklenburg	15	0
100	Mecklenburg	21	0
101	Mecklenburg	10	0
102	Mecklenburg	19	0
103	Mecklenburg	16	0
104	Mecklenburg	26	0
105	Mecklenburg	12	0
106	Mecklenburg	10	0
107	Mecklenburg	11	1
108	Gaston	20	0
109	Gaston	14	0
110	Cleveland	10	0
	Gaston	12	0
111	Cleveland	11	0
	Rutherford	6	0
112	Mecklenburg	17	0
113	Henderson	8	0
	McDowell	2	0
	Polk	7	0
	Rutherford	11	0
114	Buncombe	29	0
115	Buncombe	32	0
116	Buncombe	18	0

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
117	Henderson	26	0
118	Haywood	29	0
	Madison	12	0
119	Jackson	13	0
	Swain	5	0
	Transylvania	15	0
120	Cherokee	16	0
	Clay	9	0
	Graham	4	0
	Macon	15	0
	Total:	**2,659**	**7**

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by County Report

District Plan: SL 2021-175 House

County	Whole VTDs	Split VTDs
Alamance	37	0
Alexander	10	0
Alleghany	4	0
Anson	9	0
Ashe	17	0
Avery	19	0
Beaufort	21	0
Bertie	12	0
Bladen	17	0
Brunswick	25	0
Buncombe	79	0
Burke	33	0
Cabarrus	40	0
Caldwell	20	0
Camden	3	0
Carteret	28	0
Caswell	9	0
Catawba	40	0
Chatham	18	0
Cherokee	16	0
Chowan	6	0
Clay	9	0
Cleveland	21	0
Columbus	26	0
Craven	20	1
Cumberland	76	0
Currituck	11	0
Dare	15	1
Davidson	43	0
Davie	14	0
Duplin	19	0
Durham	54	3
Edgecombe	21	0
Forsyth	101	0
Franklin	18	0
Gaston	46	0
Gates	6	0
Graham	4	0
Granville	15	0
Greene	10	0
Guilford	165	0
Halifax	23	0
Harnett	13	0

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Based on TIGER 2020 VTDs
[G20-VTD-SbC] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by County Report

District Plan: SL 2021-175 House

County	Whole VTDs	Split VTDs
Haywood	29	0
Henderson	34	0
Hertford	13	0
Hoke	15	0
Hyde	7	0
Iredell	29	0
Jackson	13	0
Johnston	36	0
Jones	7	0
Lee	10	0
Lenoir	22	0
Lincoln	23	0
Macon	15	0
Madison	12	0
Martin	13	0
McDowell	17	0
Mecklenburg	194	1
Mitchell	9	0
Montgomery	14	0
Moore	26	0
Nash	24	0
New Hanover	43	0
Northampton	13	0
Onslow	24	0
Orange	41	0
Pamlico	10	0
Pasquotank	9	0
Pender	20	0
Perquimans	7	0
Person	11	0
Pitt	40	0
Polk	7	0
Randolph	22	0
Richmond	16	0
Robeson	39	0
Rockingham	15	0
Rowan	41	0
Rutherford	17	0
Sampson	23	0
Scotland	7	0
Stanly	22	0
Stokes	18	0
Surry	24	0

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Based on TIGER 2020 VTDs
[G20-VTD-SbC] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Whole-Split VTD Counts by County Report

District Plan: SL 2021-175 House

County	Whole VTDs	Split VTDs
Swain	5	0
Transylvania	15	0
Tyrrell	6	0
Union	52	0
Vance	12	0
Wake	204	0
Warren	14	0
Washington	6	0
Watauga	20	0
Wayne	27	1
Wilkes	27	0
Wilson	24	0
Yadkin	12	0
Yancey	11	0
Totals:	**2,659**	**7**

PEGDEN 5

NC General Assembly

Split VTD Detail Report

District Plan: SL 2021-175 House

County	VTD	District	Total VTD Population	VTD Pop in District	Percent of VTD Pop in District
Craven	002	3	18,203	6,483	35.62 %
		13	18,203	11,720	64.38 %
Dare	KDH	1	7,656	7,118	92.97 %
		79	7,656	538	7.03 %
Durham	014	29	4,535	4,232	93.32 %
		31	4,535	303	6.68 %
	023	2	10,357	1,533	14.80 %
		30	10,357	8,824	85.20 %
	30-2	2	10,654	958	8.99 %
		31	10,654	9,696	91.01 %
Mecklenburg	134	98	11,104	4,537	40.86 %
		107	11,104	6,567	59.14 %
Wayne	016	4	3,810	992	26.04 %
		10	3,810	2,818	73.96 %
			Total:	**66,319**	

Number of split VTDs: 7

PEGDEN 5

NC General Assembly

Incumbent-District Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

Last Name	First Name	Party	Current District	District in this Plan
Adams	James	Republican	96	96
Adcock	Gale	Democratic	41	41
Ager	John	Democratic	115	115
Alexander	Kelly	Democratic	107	107
Alston	Vernetta	Democratic	29	29
Arp	Larry	Republican	69	69
Autry	Johnnie	Democratic	100	100
Baker	Amber	Democratic	72	72
Baker	Kristin	Republican	82	82
Ball	Cynthia	Democratic	49	49
Belk	Mary	Democratic	88	88
Bell	John	Republican	10	10
Blackwell	Hugh	Republican	86	86
Boles	James	Republican	52	52
Bradford	John	Republican	98	98
Brisson	William	Republican	22	22
Brockman	Cecil	Democratic	60	60
Brody	Mark	Republican	55	55
Brown	Terry	Democratic	92	92
Bumgardner	Dana	Republican	109	109
Butler	Deborah	Democratic	18	18
Carney	Becky	Democratic	102	102
Clampitt	James	Republican	119	119
Clemmons	Ashton	Democratic	57	57
Cleveland	George	Republican	14	14
Cooper-Suggs	Linda	Democratic	24	24
Cunningham	Carla	Democratic	106	106
Dahle	Allison	Democratic	11	11
Davis	Robert	Republican	20	20
Dixon	James	Republican	4	4
Elmore	Jeffrey	Republican	94	94
Everitt	Terence	Democratic	35	35
Faircloth	Joseph	Republican	62	62
Farkas	Brian	Democratic	9	9
Fisher	Susan	Democratic	114	114
Gailliard	James	Democratic	25	25
Garrison	Terry	Democratic	32	32
Gill	Rosa	Democratic	33	33
Gillespie	Karl	Republican	120	120
Goodwin	Edward	Republican	1	1
Graham	Charles	Democratic	47	47
Greene	Edwin	Republican	85	85

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM

Row shading indicates that the district in this plan is shared by more than one incumbent.

[G20-IncDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Incumbent-District Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

Last Name	First Name	Party	Current District	District in this Plan
Hall	Destin	Republican	87	87
Hall	Kyle	Republican	91	91
Hanig	Robert	Republican	6	1
Hardister	Jonathan	Republican	59	59
Harris	Wesley	Democratic	105	105
Harrison	Mary	Democratic	61	61
Hastings	Kelly	Republican	110	110
Hawkins	Zack	Democratic	31	31
Howard	Julia	Republican	77	77
Humphrey	Thomas	Republican	12	12
Hunt	Rachel	Democratic	103	103
Hunter	Howard	Democratic	5	5
Hurley	Patricia	Republican	70	70
Hurtado	Ricardo	Democratic	63	63
Iler	Francis	Republican	17	17
Insko	Verla	Democratic	56	56
John	Joseph	Democratic	40	40
Johnson	Jake	Republican	113	113
Jones	Abraham	Democratic	38	38
Jones	Brenden	Republican	46	46
Kidwell	Keith	Republican	79	79
Lambeth	Donny	Republican	75	75
Lofton	Brandon	Democratic	104	104
Logan	Carolyn	Democratic	101	101
Lucas	Marvin	Democratic	42	42
Majeed	Nasif	Democratic	99	99
Martin	David	Democratic	34	34
McElraft	Patricia	Republican	13	13
McNeely	Jeffrey	Republican	84	84
McNeill	Allen	Republican	78	78
Meyer	Graig	Democratic	50	50
Miller	Charles	Republican	19	19
Mills	Paul	Republican	95	95
Moffitt	Timothy	Republican	117	117
Moore	Timothy	Republican	111	111
Morey	Marcia	Democratic	30	30
Moss	Ben	Republican	66	52
Paré	Erin	Republican	37	37
Penny	Howard	Republican	53	53
Pickett	Phillip	Republican	93	93
Pierce	Garland	Democratic	48	48
Pittman	Larry	Republican	83	82

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Row shading indicates that the district in this plan is shared by more than one incumbent.
[G20-IncDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

Incumbent-District Report

District Plan: SL 2021-175 House
Residence Set: NC House - 10/01/2021

Last Name	First Name	Party	Current District	District in this Plan
Pless	Steven	Republican	118	118
Potts	Larry	Republican	81	81
Pyrtle	Armor	Republican	65	65
Quick	Amos	Democratic	58	58
Reives	Robert	Democratic	54	54
Richardson	William	Democratic	44	44
Riddell	Dennis	Republican	64	64
Roberson	James	Democratic	39	39
Rogers	David	Republican	112	113
Saine	Jason	Republican	97	97
Sasser	Clayton	Republican	67	67
Sauls	John	Republican	51	51
Setzer	Mitchell	Republican	89	89
Shepard	Phillip	Republican	15	15
Smith	Carson	Republican	16	16
Smith	Kandie	Democratic	8	8
Smith	Raymond	Democratic	21	10
Stevens	Sarah	Republican	90	90
Strickland	Larry	Republican	28	28
Szoka	John	Republican	45	45
Terry	Evelyn	Democratic	71	71
Torbett	John	Republican	108	108
Turner	Brian	Democratic	116	116
Tyson	John	Republican	3	3
von Haefen	Julie	Democratic	36	36
Warren	Harry	Republican	76	76
Watford	Samuel	Republican	80	80
Wheatley	Diane	Republican	43	43
White	Donna	Republican	26	26
Willingham	Shelly	Democratic	23	23
Willis	David	Republican	68	68
Winslow	Matthew	Republican	7	7
Wray	Michael	Democratic	27	27
Yarborough	Lawrence	Republican	2	2
Zachary	Walter	Republican	73	77
Zenger	Jeffrey	Republican	74	74

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Row shading indicates that the district in this plan is shared by more than one incumbent.
[G20-IncDist] - Generated 11/4/2021

PEGDEN 5

NC General Assembly

District-Incumbent Report

District Plan: SL 2021-175 House
Residence Set: NC House - 10/01/2021

District in this Plan	Last Name	First Name	Party	Current District
1	Goodwin	Edward	Republican	1
	Hanig	Robert	Republican	6
2	Yarborough	Lawrence	Republican	2
3	Tyson	John	Republican	3
4	Dixon	James	Republican	4
5	Hunter	Howard	Democratic	5
6				
7	Winslow	Matthew	Republican	7
8	Smith	Kandie	Democratic	8
9	Farkas	Brian	Democratic	9
10	Bell	John	Republican	10
	Smith	Raymond	Democratic	21
11	Dahle	Allison	Democratic	11
12	Humphrey	Thomas	Republican	12
13	McElraft	Patricia	Republican	13
14	Cleveland	George	Republican	14
15	Shepard	Phillip	Republican	15
16	Smith	Carson	Republican	16
17	Iler	Francis	Republican	17
18	Butler	Deborah	Democratic	18
19	Miller	Charles	Republican	19
20	Davis	Robert	Republican	20
21				
22	Brisson	William	Republican	22
23	Willingham	Shelly	Democratic	23
24	Cooper-Suggs	Linda	Democratic	24
25	Gailliard	James	Democratic	25
26	White	Donna	Republican	26
27	Wray	Michael	Democratic	27
28	Strickland	Larry	Republican	28
29	Alston	Vernetta	Democratic	29
30	Morey	Marcia	Democratic	30
31	Hawkins	Zack	Democratic	31
32	Garrison	Terry	Democratic	32
33	Gill	Rosa	Democratic	33
34	Martin	David	Democratic	34
35	Everitt	Terence	Democratic	35
36	von Haefen	Julie	Democratic	36
37	Paré	Erin	Republican	37
38	Jones	Abraham	Democratic	38
39	Roberson	James	Democratic	39
40	John	Joseph	Democratic	40
41	Adcock	Gale	Democratic	41

PEGDEN 5

District-Incumbent Report

District Plan: SL 2021-175 House
Residence Set: NC House - 10/01/2021

District in this Plan	Last Name	First Name	Party	Current District
42	Lucas	Marvin	Democratic	42
43	Wheatley	Diane	Republican	43
44	Richardson	William	Democratic	44
45	Szoka	John	Republican	45
46	Jones	Brenden	Republican	46
47	Graham	Charles	Democratic	47
48	Pierce	Garland	Democratic	48
49	Ball	Cynthia	Democratic	49
50	Meyer	Graig	Democratic	50
51	Sauls	John	Republican	51
52	Boles	James	Republican	52
	Moss	Ben	Republican	66
53	Penny	Howard	Republican	53
54	Reives	Robert	Democratic	54
55	Brody	Mark	Republican	55
56	Insko	Verla	Democratic	56
57	Clemmons	Ashton	Democratic	57
58	Quick	Amos	Democratic	58
59	Hardister	Jonathan	Republican	59
60	Brockman	Cecil	Democratic	60
61	Harrison	Mary	Democratic	61
62	Faircloth	Joseph	Republican	62
63	Hurtado	Ricardo	Democratic	63
64	Riddell	Dennis	Republican	64
65	Pyrtle	Armor	Republican	65
66				
67	Sasser	Clayton	Republican	67
68	Willis	David	Republican	68
69	Arp	Larry	Republican	69
70	Hurley	Patricia	Republican	70
71	Terry	Evelyn	Democratic	71
72	Baker	Amber	Democratic	72
73				
74	Zenger	Jeffrey	Republican	74
75	Lambeth	Donny	Republican	75
76	Warren	Harry	Republican	76
77	Howard	Julia	Republican	77
	Zachary	Walter	Republican	73
78	McNeill	Allen	Republican	78
79	Kidwell	Keith	Republican	79
80	Watford	Samuel	Republican	80
81	Potts	Larry	Republican	81

PEGDEN 5

NC General Assembly

District-Incumbent Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

District in this Plan	Last Name	First Name	Party	Current District
82	Baker	Kristin	Republican	82
	Pittman	Larry	Republican	83
83				
84	McNeely	Jeffrey	Republican	84
85	Greene	Edwin	Republican	85
86	Blackwell	Hugh	Republican	86
87	Hall	Destin	Republican	87
88	Belk	Mary	Democratic	88
89	Setzer	Mitchell	Republican	89
90	Stevens	Sarah	Republican	90
91	Hall	Kyle	Republican	91
92	Brown	Terry	Democratic	92
93	Pickett	Phillip	Republican	93
94	Elmore	Jeffrey	Republican	94
95	Mills	Paul	Republican	95
96	Adams	James	Republican	96
97	Saine	Jason	Republican	97
98	Bradford	John	Republican	98
99	Majeed	Nasif	Democratic	99
100	Autry	Johnnie	Democratic	100
101	Logan	Carolyn	Democratic	101
102	Carney	Becky	Democratic	102
103	Hunt	Rachel	Democratic	103
104	Lofton	Brandon	Democratic	104
105	Harris	Wesley	Democratic	105
106	Cunningham	Carla	Democratic	106
107	Alexander	Kelly	Democratic	107
108	Torbett	John	Republican	108
109	Bumgardner	Dana	Republican	109
110	Hastings	Kelly	Republican	110
111	Moore	Timothy	Republican	111
112				
113	Johnson	Jake	Republican	113
	Rogers	David	Republican	112
114	Fisher	Susan	Democratic	114
115	Ager	John	Democratic	115
116	Turner	Brian	Democratic	116
117	Moffitt	Timothy	Republican	117
118	Pless	Steven	Republican	118
119	Clampitt	James	Republican	119
120	Gillespie	Karl	Republican	120

PEGDEN 4

2021 JOINT REDISTRICTING COMMITTEE PROPOSED CRITERIA

- Equal Population. The Committees will use the 2020 federal decennial census data as the sole basis of population for the establishment of districts in the 2021 Congressional, House and Senate plans. The number of persons in each legislative district shall be within plus or minus 5 percent of the ideal district population, as determined under the most recent federal decennial census. The number of persons in each congressional district shall be as nearly as equal as practicable, as determined under the most recent federal decennial census.

- Contiguity. Legislative and congressional districts shall be comprised of contiguous territory. Contiguity by water is sufficient.

- Counties, Groupings and Traversals. The Committees shall draw legislative districts within county groupings as required by *Stephenson v. Bartlett*, 355 N.C. 354, 562 S.E. 2d 377 (2002) (*Stephenson I*), *Stephenson v. Bartlett*, 357 N.C. 301, 582 S.E.2d 247 (2003) (*Stephenson II*), *Dickson v. Rucho*, 367 N.C. 542, 766 S.E.2d 238 (2014) (*Dickson I*) and *Dickson v. Rucho*, 368 N.C. 481, 781 S.E.2d 460 (2015) (*Dickson II*). Within county groupings, county lines shall not be traversed except as authorized by *Stephenson I*, *Stephenson II*, *Dickson I*, and *Dickson II*.

  Division of counties in the 2021 Congressional plan shall only be made for reasons of equalizing population and consideration of double bunking. If a county is of sufficient population size to contain an entire congressional district within the county's boundaries, the Committees shall construct a district entirely within that county.

- Racial Data. Data identifying the race of individuals or voters *shall not* be used in the construction or consideration of districts in the 2021 Congressional, House and Senate plans.

- VTDs. Voting districts ("VTDs") should be split only when necessary.

- Compactness. The Committees shall make reasonable efforts to draw legislative districts in the 2021 Congressional, House and Senate plans that are compact. In doing so, the Committee may use as a guide the minimum Reock ("dispersion") and Polsby-Popper ("perimeter") scores identified by Richard H. Pildes and Richard G. Neimi in *Expressive Harms, "Bizarre Districts," and Voting Rights: Evaluating Election-District Appearances After Shaw v. Reno*, 92 Mich. L. Rev. 483 (1993).

- Municipal Boundaries. The Committees may consider municipal boundaries when drawing districts in the 2021 Congressional, House and Senate plans.

- Election Data. Partisan considerations and election results data *shall not* be used in the drawing of districts in the 2021 Congressional, House and Senate plans.

NCLCV v. Hall
21 CVS 15426
LDTX184

Exhibit #
Pegden 5
JH-12/30/2021
exhibitsticker.com

PEGDEN 4

- Member Residence. Member residence may be considered in the formation of legislative and congressional districts.

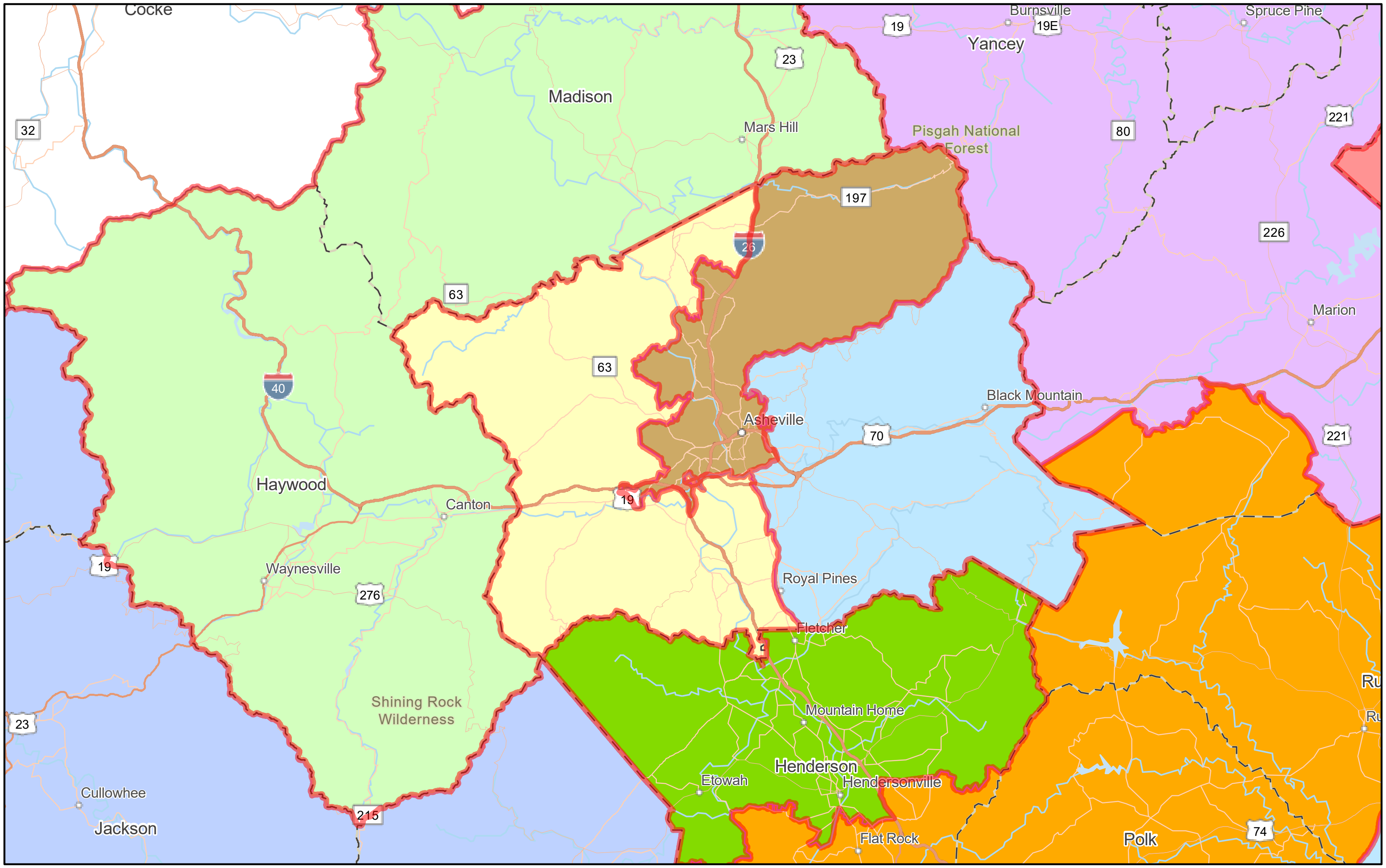
- Community Consideration. So long as a plan complies with the foregoing criteria, local knowledge of the character of communities and connections between communities may be considered in the formation of legislative and congressional districts.

S.L. 2021-174 Congress

Source: SL 2021-174 Congress

Printed by the NC General Assembly, November 4, 2021.

NC House Map - Enacted 2021



12/30/2021

NCLCV v. Hall
21 CVS 15426
LDTX186

Exhibit #
Pegden 7
JH-12/30/2021

1:577,791

0 4 8 16 mi
0 5 10 20 km

...ncombe County, NC, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA,

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
21 CVS 015426
21 CVS 500085

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, et al.,

Plaintiffs,

vs.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

REBECCA HARPER, et al.,

Plaintiffs,

vs.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

LEGISLATIVE DEFENDANTS' NOTICE OF DEPOSITION OF SAM HIRSCH

PLEASE TAKE NOTICE that on December 31, 2021, beginning at 9:00 a.m., Legislative Defendants in the above-captioned matter will take the deposition of Sam Hirsch via an online videoconference, pursuant to Rules 26 and 30 of the North Carolina Rules of Civil Procedure. The testimony will be recorded by video recording and stenographic means and will be taken remotely before a Notary Public or some other person duly authorized by law to take depositions. The deponent, court reporter, and counsel will each remotely join the videoconference via phone and/or

NCLCV v. Hall
21 CVS 15426
LDTX187

Exhibit #:
Hirsch 01
12/09/21 - DLP
exhibitsticker.com

an email invitation that will be sent by the court reporter. The examination shall continue from day to day until completed. All counsel are invited to attend and cross-examine as provided by law.

This the 27th day of December, 2021.

/s/ Phillip J. Strach

NELSON MULLINS RILEY &
SCARBOROUGH LLP
Phillip J. Strach (NC Bar No. 29456)
phillip.strach@nelsonmullins.com
Thomas A. Farr (NC Bar No. 10871)
tom.farr@nelsonmullins.com
Alyssa M. Riggins (NC Bar No. 52366)
alyssa.riggins@nelsonmullins.com
4140 Parklake Avenue, Suite 200
Raleigh, NC 27612
Telephone: (919) 329-3800

BAKER HOSTETLER LLP
Mark E. Braden* (DC Bar No. 419915)
MBraden@bakerlaw.com
Katherine McKnight* (VA Bar No. 81482)
kmcknight@bakerlaw.com
1050 Connecticut Ave NW, Suite 1100 Washington
DC 20036
* Admitted Pro Hac Vice

CERTIFICATE OF SERVICE

It is hereby certified that on this the 27th day of December, 2021, the foregoing was served on the individuals below by email:

Burton Craige
Narendra K. Ghosh
Paul E. Smith
Patterson Harkavy LLP
100 Europa Drive, Suite 420
Chapel Hill, NC 27517
bcraige@pathlaw.com
nghosh@pathlaw.com
psmith@pathlaw.com
Counsel for Plaintiffs Rebecca Harper, et al.

Abha Khanna
Elias Law Group LLP
1700 Seventh Avenue, Suite 2100
Seattle, WA 98101
AKhanna@elias.law
Counsel for Plaintiffs Rebecca Harper, et al.

Aria C. Branch
Lalitha D. Madduri
Jacob D. Shelly
Graham W. White
Elias Law Group LLP
10 G Street NE, Suite 600
Washington, DC 20002
ABranch@elias.law
LMadduri@elias.law
JShelly@elias.law
GWhite@elias.law
Counsel for Plaintiffs Rebecca Harper, et al.

Elisabeth S. Theodore
R. Stanton Jones
Samuel F. Callahan
Arnold and Porter
Kaye Scholer LLP
601 Massachusetts Avenue NW
Washington, DC 20001-3743
elisabeth.theodore@arnoldporter.com
Counsel for Plaintiffs Rebecca Harper, et al.

Terence Steed
Special Deputy Attorney General
N.C. Department of Justice
Post Office Box 629
Raleigh, NC 27602-0629
tsteed@ncdoj.gov
Counsel for the North Carolina State Board of Elections; Damon Circosta, Stella Anderson, Jeff Carmon III, Stacy Eggers IV, and Tommy Tucker, in their official capacities with the State Board of Elections

David J. Bradford
Jenner & Block LLP
353 North Clark Street
Chicago, IL 60654
dbradford@jenner.com

Counsel for Plaintiffs North Carolina League of Conservation Voters, et al.

Stephen D. Feldman
Robinson, Bradshaw & Hinson, P.A.
434 Fayetteville Street, Suite 1600
Raleigh, NC 27601
sfeldman@robinsonbradshaw.com
Counsel for Plaintiffs North Carolina League of Conservation Voters, et al.

Sam Hirsch
Jessica Ring Amunson
Kali Bracey
Zachary C. Schauf
Karthik P. Reddy
Urja Mittal
Jenner & Block LLP
1099 New York Avenue, NW, Suite 900
Washington,DC 20001
shirsch@jenner.com
zschauf@jenner.com

Counsel for Plaintiffs North Carolina League of Conservation Voters, et al.

Adam K. Doerr
Robinson, Bradshaw & Hinson, P.A.
101 North Tryon Street, Suite 1900
Charlotte, NC 28246
adoerr@robinsonbradshaw.com

Erik R. Zimmerman
Robinson, Bradshaw & Hinson, P.A.
1450 Raleigh Road, Suite 100
Chapel Hill, NC 27517
ezimmerman@robinsonbradshaw.com

Counsel for Plaintiffs North Carolina League of Conservation Voters, et al.

Allison J. Riggs
Hilary H. Klein
Mitchell Brown
Katelin Kaiser
Southern Coalition For Social Justice
1415 W. Highway 54, Suite 101
Durham, NC 27707
allison@southerncoalition.org
hilaryhklein@scsj.org
Mitchellbrown@scsj.org
Katelin@scsj.org

J. Tom Boer
Olivia T. Molodanof
Hogan Lovells US LLP
3 Embarcadero Center, Suite 1500
San Francisco, CA 94111
tom.boer@hoganlovells.com
olivia.molodanof@hoganlovells.com
Counsel for Intervenor Common Cause

/s/ Phillip J. Strach

NELSON MULLINS RILEY & SCARBOROUGH LLP
Phillip J. Strach (NC Bar No. 29456)
phillip.strach@nelsonmullins.com

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
FILE NO. 21 CVS 015426

NORTH CAROLINA LEAGUE, OF CONSERVATION VOTERS, INC., *et al.*,
Plaintiffs

and

COMMON CAUSE,
Plaintiff-Intervenor,

v.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, *et al.*,
Defendants.

FILED
2021 DEC 30 PM 2:37
WAKE CO., C.S.C.
BY_____

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
FILE NO. 21 CVS 500085

REBECCA HARPER, *et al.*,
Plaintiffs

v.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, *et al.*,
Defendants.

ORDER ON (1) NCLCV PLAINTIFFS' MOTION FOR PROTECTIVE ORDER, (2) LEGISLATIVE DEFENDANTS' MOTION FOR CLARIFICATION, AND (3) LEGISLATIVE DEFENDANTS' MOTION TO SEAL

THESE MATTERs came before the undersigned three-judge panel upon 1) NCLCV Plaintiffs' Motion for Protective Order, filed December 29, 2021, pursuant to Rule 26(c) of the North Carolina Rules of Civil Procedure; 2) Legislative Defendants' Motion for Clarification, and in the alternative, Motion to Compel, submitted provisionally under seal on December

NCLCV v. Hall
21 CVS 15426
LDTX188

29, 2021, pursuant to Rules 26, 30, and 37 of the Rules of Civil Procedure; and, 3) Legislative Defendants' Motion to Seal their Motion for Clarification, and in the alternative, Motion to Compel submitted contemporaneously with the Motion on December 29, 2021, pursuant to Rule 27 of the General Rules of Practice for the Superior and District Courts.

Procedural and Factual Background

In this litigation, Plaintiffs seek a declaration that the North Carolina Congressional, North Carolina Senate, and North Carolina House of Representatives districts established by an act of the General Assembly in 2021, N.C. Sess. Laws 2021-174 (Senate Bill 750), 2021-173 (Senate Bill 739), and 2021-175 (House Bill 976) (collectively the "Enacted Plans"), violate the rights of Plaintiffs under the North Carolina Constitution. Plaintiffs seek to enjoin the future use of the 2021 congressional and state legislative districts.

On December 13, 2021, after receiving an order from the Supreme Court of North Carolina directing this Court to resolve all Plaintiffs' claims on the merits by January 11, 2022, this Court entered a Case Scheduling Order giving the parties until December 31, 2021, to complete discovery in advance of trial, which is set to commence on January 3, 2022. The parties were further ordered that expert reports produced to opposing parties "shall be accompanied by all source code, source data, input parameters, and all outputted data." On December 14, 2021, Legislative Defendants filed a Motion to Compel seeking this very information for the expert reports produced by Plaintiffs during the preliminary-injunction phase of this litigation.

Legislative Defendants' motion was granted in part by the Court on December 15, 2021[1]; however, NCLCV Plaintiffs were not required under that order to produce any documents or information that their expert Professor Moon Duchin did not consider or

[1] On December 15, 2021, the Court contemporaneously entered a Protective Order governing the exchange of confidential and highly confidential materials in these consolidated cases.

receive. On December 20, 2021, this Court entered an order clarifying that NCLCV Plaintiffs were to produce to Legislative Defendants the method and means by which the Optimized Maps were formulated and produced, including, but not limited to all source code, source data, input parameters, and all outputted data associated with the Optimized Maps, and that NCLCV Plaintiffs were to identify any and all persons who took part in drawing or participated in the computerized production of the Optimized Maps. This production was ordered to occur by the December 23, 2021, deadline in the Case Scheduling Order for initial expert reports.

After the production of this material, Legislative Defendants thereafter noticed the deposition of Sam Hirsch, an attorney in Jenner & Block LLP's Washington D.C. office and admitted *pro hac vice* by this Court as counsel of record for NCLCV Plaintiffs, on December 27, 2021. The notice of deposition states that Mr. Hirsch's deposition is scheduled to occur on December 31, 2021. Legislative Defendants likewise included Mr. Hirsch in their list of witnesses they may call to testify at trial, and this list was provided to NCLCV Plaintiffs on December 27, 2021.

On December 29, 2021, NCLCV Plaintiffs filed the present Motion for a Protective Order, seeking to quash the notice of deposition directed to Sam Hirsch and direct Legislative Defendants to strike Sam Hirsch from their witness list for trial. Legislative Defendants submitted a written response to this motion on December 29, 2021.

Also on December 29, 2021, Legislative Defendants submitted provisionally under seal the present Motion for Clarification, or in the alternative, Motion to Compel, seeking an order clarifying whether this Court's order granting *pro hac vice* status to Sam Hirsch allows Legislative Defendants to obtain deposition and trial testimony of him without a subpoena, contending that Mr. Hirsch is now a fact witness in this matter. In the alternative, Legislative Defendants seek an order compelling Mr. Hirsch to testify at the noticed deposition and at trial. Legislative Defendants also filed a Motion to Seal the Motion for Clarification due to NCLCV Plaintiffs designating the entirety of their documents produced in response to this Court's December 20, 2021, Order as Confidential per the Court's December 15, 2021, Protective Order. NCLCV Plaintiffs submitted a written response to these motions on December 29, 2021.

The parties have fully briefed their respective positions on the Motions, and the matters are now ripe for resolution by the Court.

<u>NCLCV Plaintiffs' Motion for Protective Order and Legislative Defendants' Motion for Clarification, and in the alternative, Motion to Compel</u>

After considering NCLCV Plaintiffs' motion and Legislative Defendants' motion, the parties' respective responses to the motions, and the matters contained therein, and having reviewed the record proper, the Court, in its discretion, rules upon the motions as follows:

Testimony Regarding the Optimized Maps is Relevant to the Issues in this Redistricting Litigation and Compelling the Testimony of Mr. Hirsch Satisfies the Shelton *Test*

"Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the pending action, whether it relates to the claim or defense of the party seeking discovery or to the claim or defense of any other party." N.C.G.S. § 1A-1, Rule 26(b)(1). "The test for relevance for discovery purposes only requires that information be 'reasonably' calculated to lead to the discovery of admissible evidence.'" *Lowd v. Reynolds*, 205 N.C. App. 208, 214, 695 S.E.2d 479, 483 (2010) (quoting N.C.G.S. § 1A-1, Rule 26(b)(1)). "[O]rders regarding discovery are within the discretion of the trial court." *Dworsky v. Travelers Ins. Co.*, 49 N.C. App. 446, 448, 271 S.E.2d 522, 523 (1980). One method of obtaining discovery is through depositions upon oral examination, which are governed by Rule 30 of the North Carolina Rules of Civil Procedure. Rule 30 provides that "[a]fter commencement of the action, any party may take the testimony of *any person*, including a party, by deposition upon oral examination." N.C.G.S. § 1A-1, Rule 30(a) (emphasis added). Furthermore, the

Rule provides that "[t]he attendance of witnesses *may* be compelled by subpoena as provided in Rule 45[.]" *Id.* (emphasis added).

Trial courts have authority over the proceedings before it, as well as the counsel in those proceedings. Indeed, the power of the court to deal with its attorneys "is an inherent one because it is an essential one for the court to possess in order for it to protect itself from fraud and impropriety and to serve the ends of the administration of justice which are, fundamentally, the *raison d'etre* for the existence and operation of the courts." *Law Offices of Peter H. Priest, PLLC v. Coch*, 2014 NCBC 54, *36 (quoting *Swenson v. Thibaut*, 39 N.C. App. 77, 109, 250 S.E.2d 279, 299 (1978)).

"The seminal case on the issue of deposing litigation counsel is *Shelton v. American Motors Corp.*, 805 F.2d 1323 (8th Cir. 1986), which limited the deposition of opposing counsel to circumstances 'where the party seeking to take the deposition has shown that (1) no other means exist to obtain the information than to depose opposing counsel; (2) the information sought is relevant and nonprivileged [sic]; and (3) the information is crucial to the preparation of the case. Courts throughout the country, including North Carolina's federal courts, have adopted the *Shelton* test." *Blue Ridge Pediatric & Adolescent Med., Inc. v. First Colony Healthcare, LLC*, 2012 NCBC 45, 58 (N.C. Super. Ct. Aug 9, 2012) (internal citation omitted).

As did the trial court in *Blue Ridge Pediatric & Adolescent Med.*, this Court agrees that "[w]hile not binding on this Court, *Shelton* and its progeny offer guidance to the Court in deciding this motion. This Court concludes that the *Shelton* test is appropriate in this case because the test closely parallels the language of Rule 26, which allows a party to limit discovery by convincing a court that information sought in discovery by deposition, upon oral examination, is (1) not 'obtainable from some other [less burdensome] source . . . ,' (2) 'not privileged . . . ,' and (3) 'importan[t to] the issues at stake in the litigation.'" *Id.* at 61 (citing N.C. R. Civ. P. 26(b)(1)) (alterations in original).

Here, NCLCV Plaintiffs are correct that the ordinary manner by which a party can compel a witness's attendance at a deposition is to issue a subpoena to that witness; however, in the extraordinary circumstances governing the timing constraints of this case to come to a full resolution of all claims by January 11, 2022, compelling Mr. Hirsch to sit for deposition—as noticed, despite the absence of a subpoena—serves the needs of this important litigation and the ends of the administration of justice in a case in which he has made an appearance. Indeed, the only means that exist to obtain the information is to depose Mr. Hirsch, the information sought is relevant and nonprivileged, and the information is crucial to the preparation of the case. Evidence before the Court demonstrates that NCLCV Plaintiffs, in complying with the Court's December 20, 2021, Order, identified Mr. Hirsch as a person who plainly and meaningfully took part in the drawing and computerized production of the Optimized Maps. *See* Leg. Def. Mot. to Clarify, Exhibit A. Mr. Hirsch's involvement, the Court observes, occurred prior to the initiation of NCLCV Plaintiffs' legal action filed against the Legislative Defendants challenging the state legislative and congressional redistricting plans at issue—and the other persons involved are not expected to be called as witnesses in this case. *Id.* Accordingly, the information sought through Mr. Hirsch's deposition is relevant and can only be obtained through him. The Court, however, acknowledges that because attorney-client privilege may protect some of the information to which Mr. Hirsch will be called to testify, nothing in this Order shall be construed as a limitation on NCLCV Plaintiffs' or Mr. Hirsch's ability to assert *bona fide* attorney-client privilege and work product doctrine assertions at his deposition.

Furthermore, as the Court explained in its Order on Legislative Defendants' Motion for Partial Reconsideration, the underlying data and persons involved in the creation of the

Optimized Maps are indeed relevant and discoverable for the following reasons: the Optimized Maps were presented, and referenced over ninety (90) times, to the Court in NCLCV Plaintiffs' Complaint; at the hearing on the Motion for Preliminary Injunction the NCLCV Plaintiffs mentioned the Optimized Maps on numerous occasions and provided the Court with copies of the same; and, NCLCV Plaintiffs, in both their Complaint and at the hearing on the Motion for Preliminary Injunction, requested that in the event Legislative Defendants are required to draw remedial maps and fail to do so to the satisfaction of the Court, that the Court require the use of the Optimized Maps for the 2022 Elections. Simply put, NCLCV Plaintiffs have put the issue of the Optimized Maps before the Court, and this includes the testimony of a person who directed the creation of the Optimized Maps. Accordingly, this Court will deny NCLCV Plaintiffs' Motion for a Protective Order and grant Legislative Defendants' Motion seeking to compel Mr. Hirsch's appearance at the noticed deposition and, if called, at trial.

Mr. Hirsch Carries the Responsibility for Complying with the Ethical Rules Governing When an Attorney May Be Called Upon as Both an Advocate and Necessary Witness at Trial

As an additional matter, when seeking to be admitted *pro hac vice*, an attorney must certify "that with reference to all matters incident to the proceeding, the attorney agrees to be subject to the orders and . . . the civil jurisdiction of the General Court of Justice." N.C.G.S. § 84-4.1(3).

It is incumbent upon attorneys admitted *pro hac vice* to comply with our state's rules of professional conduct. At issue here, Rule 3.7 of the North Carolina Rules of Professional Conduct provides that "[a] lawyer shall not act as advocate at a trial in which the lawyer is likely to be a necessary witness unless: (1) the testimony relates to an uncontested issue; (2) the testimony relates to the nature and value of legal services rendered in the case; or (3) disqualification of the lawyer would work substantial hardship on the client." N.C. Rules of

Prof'l Conduct R. 3.7(a). In a Formal Ethics Opinion issued by the N.C. State Bar on April 22, 2011, entitled "Lawyer as Advocate and Witness," the State Bar explained that this Rule requires the attorney to evaluate whether he or she may become a necessary witness in a case. 2011 Formal Ethics Opinion 1 ("A lawyer who is named as a witness by an opposing party must evaluate his knowledge of the facts in controversy and make a good faith determination as to whether his testimony will be relevant, material, and unobtainable elsewhere. This evaluation must be ongoing as the case moves toward trial, contested issues are identified, and discovery discloses additional witnesses and information about the case. However, to avoid prejudicing a client due to a last-minute change of trial counsel, a lawyer should withdraw from representation in the trial if the lawyer knows or reasonably should know that he is a necessary witness."). The Formal Ethics Opinion also clarified that the "underlying reason for the prohibition—confusion of the trier of fact relative to the lawyer's role—does not apply when the lawyer's advocacy is limited to activities outside the courtroom. Although a lawyer may continue to provide representation outside the courtroom, the lawyer should not use this as an excuse to delay withdrawal from representation in the litigation if the lawyer knows or reasonably should know that he is a necessary witness." *Id.* (internal citations omitted).

Although Mr. Hirsch's representation of NCLCV Plaintiffs outside of the courtroom does not implicate Rule 3.7, NCLCV Plaintiffs have indicated that Mr. Hirsch is set to examine certain witnesses at the trial of these consolidated cases. As such, it is incumbent upon Mr. Hirsch to determine whether he is a necessary witness such that he would need to withdraw as counsel at the trial of this matter.

<u>Legislative Defendants' Motion to Seal</u>

As the Court reminded the parties in the December 13, 2021, Case Scheduling Order, if a party intends to submit any materials under seal, they are to comply with Rule 27 of the

General Rules of Practice. Rule 27 of the General Rules of Practice governs the process for when a party submits a document under seal, and further provides that the court "may rule on the motion with or without a hearing. In the absence of a motion or brief that justifies sealing the document, the court may order that the document (or part of the document) be made public." N.C. R. Super. & Dist. Cts. 27(b)(6).

NCLCV Plaintiffs have designated as Confidential the document included with Legislative Defendants' Motion to Clarify as Exhibit A. In their written response to the Motion to Seal, NCLCV Plaintiffs state that they agree that the Motion for Clarification may enter the public record, including its discussion of Mr. Hirsch related to the Optimized Maps, but maintain that the Cover Letter attached to that motion is confidential and should be sealed. NCLCV Plaintiffs have proposed to provide a public version of the document disclosing general information described in Legislative Defendants' Motion while redacting other, specific portions and maintaining the full unredacted version under seal indefinitely.

The Court disagrees with Legislative Defendants that the document marked as Exhibit A to Legislative Defendants' Motion to Clarify was not properly designated as Confidential by NCLCV Plaintiffs at the time of disclosure. The Court also appreciates that NCLCV Plaintiffs have proposed a reasonable alternative to balance public access to the record in this case with the need for certain information, if properly designated, to remain confidential. The Court, however, finds that the nature of the information disclosed—for the reasons explained above—and the compelling public interest in the nature of this litigation requires that Exhibit A be made a part of the public record in full. Accordingly, this Court will order that Legislative Defendants' Motion to Seal be Denied and that the Motion and attached Exhibit A be filed as part of the public record.

Conclusion

WHEREFORE, the Court, for the reasons stated herein and in the exercise of its discretion, hereby ORDERS the following:

1. NCLCV Plaintiffs' Motion for a Protective Order is DENIED.

2. Legislative Defendants' Motion to Clarify is GRANTED and Mr. Sam Hirsch is hereby commanded to appear at the duly noticed deposition on December 31, 2021, or at another time and place agreed upon by the parties, and, if called, testify at trial set to commence January 3, 2022.

3. Legislative Defendants' Motion to Seal is DENIED and the Motion and attached Exhibit A shall be filed as part of the public record.

SO ORDERED, this the 30 day of December, 2021.

A. Graham Shirley, Superior Court Judge

/s/ Nathaniel J. Poovey

Nathaniel J. Poovey, Superior Court Judge

/s/ Dawn M. Layton

Dawn M. Layton, Superior Court Judge

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was served on the persons indicated below via e-mail transmission addressed as follows:

Burton Craige
Narendra K. Ghosh
Paul E. Smith
PATTERSON HARKAVY LLP
100 Europa Dr., Suite 420
bcraige@pathlaw.com
nghosh@pathlaw.com
psmith@pathlaw.com
Counsel for Harper Plaintiffs

Stephen D. Feldman
Adam K. Doerr
Erik R. Zimmerman
ROBINSON, BRADSHAW & HINSON, P.A.
434 Fayetteville Street, Suite 1600
Raleigh, NC 27601
sfeldman@robinsonbradshaw.com
adoerr@robinsonbradshaw.com
ezimmerman@robinsonbradshaw.com
Counsel for NCLCV Plaintiffs

Allison J. Riggs
Hilary H. Klein
Mitchell Brown
Katelin Kaiser
Jeffrey Loperfido
SOUTHERN COALITION FOR
SOCIAL JUSTICE
1415 W. Highway 54, Suite 101
Durham, NC 27707
allison@southerncoalition.org
hilaryhklein@scsj.org
mitchellbrown@scsj.org
katelin@scsj.org
jeffloperfido@scsj.org
Counsel for Common Cause Plaintiff-Intervenor

Phillip J. Strach
Thomas A. Farr
Alyssa M. Riggins
John E. Branch, III
NELSON MULLINS RILEY &
SCARBOROUGH LLP
4140 Parklake Avenue, Suite 200
Raleigh, NC 27612
Phillip.strach@nelsonmullins.com
Tom.farr@nelsonmullins.com
Alyssa.riggins@nelsonmullins.com
John.Branch@nelsonmullins.com
Counsel for Legislative Defendants

Terence Steed
Amar Majmundar
Stephanie A. Brennan
NORTH CAROLINA DEPARTMENT
OF JUSTICE
Post Office Box 629
Raleigh, NC 27602
tsteed@ncdoj.gov
amajmundar@ncdoj.gov
sbrennan@ncdoj.gov
Counsel for State Board Defendants

Service is made upon local counsel for all attorneys who have been granted pro hac vice admission, with the same effect as if personally made on a foreign attorney within this state.

This the 30th day of December 2021.

/s/ Kellie Z. Myers
Kellie Z. Myers
Trial Court Administrator
10th Judicial District
Kellie.Z.Myers@nccourts.org

1099 NEW YORK AVENUE, NW WASHINGTON, DC 20002

JENNER&BLOCK LLP

December 23, 2021

Zachary Schauf
Tel +1 202 637 6379
zschauf@jenner.com

BY ELECTRONIC UPLOAD

Phillip J. Strach
Thomas A. Farr
Alyssa M. Riggins
Nelson Mullins Riley & Scarborough LLP
4140 Parklake Ave., Ste. 200
Raleigh, NC 27612
Phillip.Strach@nelsonmullins.com
Tom.Farr@nelsonmullins.com
Alyssa.Riggins@nelsonmullins.com

Mark E. Braden
Katherine McKnight
Baker Hostetler LLP
1050 Connecticut Ave., NW Ste. 1100
Washington, DC 20036
MBraden@bakerlaw.com
KMcKnight@bakerlaw.com

Exhibit #:
Hirsch 03
12/09/21 - DLP
exhibitsticker.com

Re: Production of Documents and Information Pursuant to December 20 Court Order

Dear Counsel:

Pursuant to the December 20, 2021 Order of the Superior Court in case number 21-CVS-015426, enclosed is a production on behalf of Plaintiffs the North Carolina League of Conservation Voters, Inc. et al. ("the NCLCV Plaintiffs"). These files are being produced via electronic file transfer, and a password will be provided under separate cover.

Please note that this letter and all files produced as part of this production are designated as "CONFIDENTIAL" within the meaning of, and subject to, the Protective Order entered by the Superior Court dated December 15, 2021. These materials comprise competitively sensitive or proprietary information, research and analysis, development and/or commercial information, and are otherwise protected from disclosure. Counsel are advised that under the Protective Order, this letter and all produced materials "shall be used by the Parties solely in connection with this litigation" and may not be used for any "political, business, commercial, competitive, personal, governmental, or other purpose or function whatsoever, and such information shall not be disclosed to anyone" except as provided by the Protective Order. For avoidance of doubt, all information produced as part of this production shall be considered "CONFIDENTIAL" even if not individually labeled or otherwise designated as such.

The Court's December 20 Order requires the NCLCV Plaintiffs to "produce to the Legislative Defendants the method and means by which the Optimized Maps were formulated and produced,

NCLCV v. Hall
21 CVS 15426
LDTX189

CONFIDENTIAL PURSUANT TO DECEMBER 15, 2021 PROTECTIVE ORDER

including, but not limited to all source code, source data, input parameters, and all outputted data associated with the Optimized Maps," and to "further identify any and all persons who took part in drawing or participated in the computerized production of the Optimized Maps."

The NCLCV Plaintiffs do not intend to offer evidence at trial about how these maps were created. Instead, the NCLCV Plaintiffs intend to rely on them to demonstrate the error in your clients' argument that the Enacted Plans' extreme partisan bias was inevitable. We therefore refer to them below as "the NCLCV Plaintiffs' demonstrative maps."

The NCLCV Plaintiffs' demonstrative maps were formulated and produced through the following method and means:

1. The process began with the compilation of source data relevant to congressional, senate, and house redistricting for the state of North Carolina. The data sources were public demographic data from the United States Census Bureau's decennial census and American Community Survey, public historical electoral data from the North Carolina State Board of Elections, and shapefiles reflecting geographic and political-subdivision boundaries that form the base layers for districting and provide the means to translate data from one geographic unit (*e.g.*, Census blocks or 2012 precincts) to another (*e.g.*, 2020 VTDs).

2. The demographic, electoral, and geographic data was then organized into data sets. This involved the creation of computer scripts to compile source data and to analyze source data for use in map-optimization. For example, North Carolina State Board of Elections electoral data and demographic data were analyzed using ecological-inference tools to determine which candidates were preferred by voters from various demographic groups. Also, electoral and American Community Survey data was pro-rated onto blocks and VTDs using such scripts.

3. After the data sets were compiled, for each of the congressional, senate, and house maps, a script was used to generate a random "seed" map that complied with certain basic criteria—such as contiguous districts—as a starting place for further analysis.

4. The random seed map was only a starting point for a long chain of maps in a multi-objective "short burst" process. In general, the computer script many times a minute randomly identified two adjoining districts, erased the boundary between those two districts to temporarily create a double-size district, and then randomly re-split that double-size district into two contiguous and roughly equally populated new districts. The chain took a series (a "short burst") of random steps, evaluated all the plans it encountered, and then chose from among the best plans so far to start its next short burst. Over the course of many steps, the maps thus changed dramatically. The source code that evaluated the plans to determine the "best" starting point for the next short burst used input parameters that incorporated key legal requirements that apply to North Carolina redistricting such as population balance, contiguity, respect for counties, geographic compactness, minority electoral opportunity, and partisan fairness. Over time, the chain tended to find maps that performed increasingly better on these various criteria. Chains were also run with different

CONFIDENTIAL PURSUANT TO DECEMBER 15, 2021 PROTECTIVE ORDER

parameters simultaneously, to identify the best available map. For congressional districts, the chains ran statewide. For senate and house districts, chains were confined to a particular "county cluster," given the North Carolina Supreme Court's interpretation of the North Carolina State Constitution's Whole County Provisions.

5. To allow the computer to robustly explore alternative possibilities, the chains just described tolerated maps with population deviations that somewhat exceeded the limits under the "one person, one vote" doctrine. So once high-performing maps were identified by these short-burst chains, they were analyzed and slightly revised with QGIS (quantum geographic information system) software to ensure, among other things, that districts' populations satisfied mandatory equal-population rules. The map was then further analyzed, and districts were numbered to facilitate comparison with the enacted districting plans.

All computer scripts, source code, source data, input parameters, and outputted data referenced in this letter are included in the produced material. NCLCV Plaintiffs hereby produce to Legislative Defendants NCLCVP_LD_01000–NCLCVP_LD_01903. To facilitate your review, we have organized these documents into six categories:

1. **Documents Related to Data Gathering (NCLCVP_LD_01000–NCLCVP_LD_01552):** These documents include raw and processed data drawn from public sources, such as the United States Census Bureau and the North Carolina State Board of Elections, typically in the form of .csv or .txt data files. Several files, for instance, reflects data from elections by voting tabulation district, or VTD. This also includes certain files that reflect geographic data. For example, several files reflect the geography of North Carolina voting tabulation districts, or VTDs. These documents also contain computer scripts that were used in data analysis to pull and initially arrange data from publicly available sources.

2. **Documents Related to Data Organization (NCLCVP_LD_01553–NCLCVP_LD_01673):** These documents include additional shapefiles and scripts used to organize and calibrate data beyond initial data gathering and preparation. They also include scripts used to analyze North Carolina State Board of Elections electoral data and demographic data, using ecological-inference tools, to determine which candidates were preferred by voters from various demographic groups. See, for example, NCLCVP_LD_1586–NCLCVP_LD_1673.

3. **Documents Related to Initial Map Generation (NCLCVP_LD_01674–NCLCVP_LD_01690):** These documents include the script, as well as associated data and shapefiles, created to find initial random "seed" maps that complied with certain basic criteria, such as contiguous districts.

4. **Documents Related to the Multi-Objective Optimization Process (NCLCVP_LD_01691–NCLCVP_LD_01764):** These files pertain to the process of conducting the randomized map-generating process. NCLCVP_LD_1699 is the central

CONFIDENTIAL PURSUANT TO DECEMBER 15, 2021 PROTECTIVE ORDER

script that was used to generate the randomized process. Other scripts in this Bates range support this process, and the remaining files include input files that provide input parameters encompassing key legal requirements that apply to North Carolina redistricting.

5. **Documents Related to Population Balancing (NCLCVP_LD_01765–NCLCVP_LD_01812):** These files are related to the process of balancing population and making other corrections using the maps generated from the multi-objective optimization process. These include QGIS files associated with the population-balancing process. See NCLCVP_LD_1787–NCLCVP_LD_1812.

6. **Documents Related to Outputted Maps (NCLCVP_LD_01813–NCLCVP_LD_01903):** An automated process generated analyses for the final outputted maps. The results of these analyses are reflected in these files. These include the block-assignment files for the NCLCV Plaintiffs' demonstrative maps, which allow anyone with redistricting software (including both commercial software and software that is available for free on the Internet) to upload and analyze the maps. We have previously provided these block-assignment files to you.

Sam Hirsch, a partner in Jenner & Block LLP's Washington office, directed the drawing and computerized production of the NCLCV Plaintiffs' demonstrative maps. Mr. Hirsch was assisted solely by two consulting experts, Amariah Becker of A Becker Consulting LLC and Dara Gold of Dara Gold LLC, who were retained or specifically employed to assist counsel in providing legal advice to the NCLCV Plaintiffs in anticipation of litigation or to prepare for trial and who are not expected to be called as witnesses during trial. These are all of the individuals who took part in drawing or participated in the computerized production of the NCLCV Plaintiffs' demonstrative maps.

With respect to this information, NCLCV Plaintiffs reserve all rights under, and do not waive any protections of, the Court's December 15, 2015 Protective Order, nor do they waive the protections of any and all other applicable privileges and protections. NCLCV Plaintiffs note that pursuant to that Order, any non-party witness must agree by affidavit, declaration, or sworn statement before the Court, that he or she has agreed to be bound by the Court's Protective Order. Pursuant to Paragraph 10(c) of the Protective Order, if you disclose, summarize, or otherwise make available this Confidential Information in whole or in part to any consulting or testifying expert retained by you for purposes of this litigation, we will require that you first provide the NCLCV Plaintiffs with copies of the executed "Exhibit A" to the Protective Order.

Best regards,

/s/ Zachary Schauf

Zachary Schauf

Enclosures

– Ex. 11234 –

ELECTION LAW JOURNAL
Volume 20, Number 4, 2021
Mary Ann Liebert, Inc.
DOI: 10.1089/elj.2020.0704

Computational Redistricting and the Voting Rights Act

Amariah Becker, Moon Duchin, Dara Gold, and Sam Hirsch

ABSTRACT

In recent years, computers have been used to generate *ensembles* of districting plans: collections of large numbers of electoral maps that are used to assess a proposed map in the context of valid alternatives. Ensemble-based outlier analysis has played a central role in recent redistricting disputes, especially regarding partisan gerrymandering. Until now, methods for generating these ensembles have enforced districting rules that are relatively simple to assess, such as population equality, but have not contended with more complex ones, such as the prohibitions against racial gerrymandering and minority vote dilution that flow from the Constitution and the Voting Rights Act (VRA). We take up the task of building ensembles of plans that respect those legal constraints. Rather than relying on demographic data alone, our method uses precinct-level returns from a large collection of recent primary and general elections. With this electoral history, we build *effectiveness scores* that identify districts where members of minority groups have had realistic opportunities to nominate and elect their preferred candidates. In a case study of Texas congressional districts, we find that detailed election data is indispensable to assessing a map's effectiveness for minority voters. Purely demographic targets, such as demanding some specific number of majority-minority districts, not only raise constitutional concerns but also are inadequate proxies for empirical effectiveness. Beyond the primary task of building VRA-conscious ensembles for comparison, we also repurpose the same algorithmic search methods to find plans that dramatically increase minority electoral opportunities. In Texas, for example, the current enacted 36-district congressional plan has perhaps 11 to 13 districts that are effective for Latino voters, Black voters, or both. We find that better mapmaking could raise that number to at least 16 without sacrificing traditional principles such as contiguity and compactness. This would nearly eliminate the historic underrepresentation of both groups throughout the state.

Keywords: redistricting, gerrymandering, Voting Rights Act, algorithmic ensembles

---

Amariah Becker conducted this study as a Data Scientist at the MGGG Redistricting Lab at Tisch College of Tufts University in Medford, Massachusetts, USA. Moon Duchin is a Professor of Mathematics and Director of the MGGG Redistricting Lab at Tufts University in Medford, Massachusetts, USA. Dara Gold conducted this study as a Data Scientist at the MGGG Redistricting Lab at Tisch College of Tufts University in Medford, Massachusetts, USA. Sam Hirsch is a Partner at Jenner & Block LLP in Washington, DC, USA.
The authors thank Jessie Amunson, Ash Bharatkumar, Charlotte Hirsch, Justin Levitt, J.N. Matthews, James Murphy, Heather Rosenfeld, Parker Rule, Gabe Schoenbach, Doug Spencer, Adam Unikowsky, and Thomas Zeitzoff for extremely helpful and stimulating conversations and in some cases for invaluable technical support of this project. Many members and student interns affiliated with the MGGG Redistricting Lab and the Voting Rights Data Institute have been involved in long-term data preparation, and we are warmly grateful for their collaboration.
Racial identification of candidates was made possible by a dataset purchased from Carl Klarner (klarnerpolitics.org).
This article is dedicated to the memory of Rice University sociology professor Chandler Davidson (1936–2021), who fought successfully for a half century to protect Latino and Black voting rights and to expand minority electoral opportunities in Texas and throughout the United States.

© Amariah Becker et al. 2021; Published by Mary Ann Liebert, Inc. This Open Access article is distributed under the terms of the Creative Commons License [CC-BY] (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

NCLCV v. Hall
21 CVS 15426
LDTX190

Exhibit #:
Hirsch 04
12/09/21 - DLP
exhibitsticker.com

1. INTRODUCTION

Today, only 107 representatives in congress—fewer than a quarter of all House members—belong to a racial or language minority group.[1] If those groups were represented in proportion to their share of the nation's adult citizen population, that number would increase to 144 Representatives.[2] And this sub-proportional representation is not confined to Congress, but is replicated today in 47 of the 50 state legislatures.[3] There are two strands of conventional wisdom on the causes of this shortfall in minority representation. Either districters simply are not trying hard enough, or entrenched patterns of racial polarization in housing and voting make proportionality impossible to attain.

This article explores a third option: perhaps better tools can bring better results. Our algorithmically generated *ensembles*—collections of thousands or millions of alternative maps—show that better-designed redistricting plans could close much (though not all) of that gap and ensure that the House of Representatives and state legislatures "look more like America" than at any time in our history.

The tools to study this issue comprehensively did not exist as recently as a decade ago, when the 50 states last redistricted. Since then, algorithmic innovation and steadily improving computational power have revolutionized our ability to understand the variety of redistricting plans that could plausibly be enacted. It is now possible to generate a multitude of diverse, valid plans on a laptop overnight—and to describe how they are distributed in the universe of all possibilities. That in turn allows any plan, including one proposed for adoption, to be compared meaningfully to the available alternatives.

Not surprisingly, work in this direction has come to dominate some types of redistricting litigation in the last few years, especially lawsuits claiming that a districting plan is excessively partisan. But until now, ensemble methods have not seriously grappled with issues of race in redistricting. And these tend to be the most heavily litigated issues in the field, due to the demands imposed by the Voting Rights Act (VRA) and the Constitution's Equal Protection Clause. The legal rules addressing race in redistricting are much more complex than, say, the "one person, one vote" doctrine in federal constitutional law, or the contiguity requirements in state constitutional law. Modeling the racial rules is far from straightforward.

This article takes up that task. First, we develop methods that incorporate the legal rules involving the consideration of race in redistricting into the algorithms that generate redistricting ensembles. The main applications of these VRA-conscious ensembles would be to study the normal range of attributes of lawful plans, for instance to assess claims of partisan gerrymandering. Second, we show that the methods used to accomplish that task can also be used to draw maps that increase opportunities for minority groups to elect candidates of their choice. As it turns out, there is the potential to provide much more opportunity, at least in some states, than was previously recognized. In short, the algorithmic creation of redistricting ensembles holds the promise of not only sharpening our understanding of redistricting choices and tradeoffs, but also better fostering the aims of the Voting Rights Act, "a statute meant to hasten the waning of racism in American politics" (*Johnson* v. *De Grandy* 1994, 1020).

To that end, one of our strongest findings deserves particular emphasis. In the past, the dominant method of looking for effective minority electoral opportunity has been to use district demographics as a proxy, such as by seeking majority-Black districts to secure effective electoral opportunities for Black voters. But in our case studies, demographic share alone is a poor proxy for effectiveness; relying too heavily on demographics could inadvertently disempower minority citizens by packing them into too few districts.

Our methods will be most helpful for proactive legislatures and commissions that wish to draw legally defensible maps that will prove effective for racial and language minority groups while upholding other criteria simultaneously. The tools described here will generate examples of maps with valuable properties and will help elucidate the cost in minority electoral opportunity, if any, that results from strict application of lower-ranked criteria. Although these tools also may be helpful to

---

[1]Bialik (2019). This figure refers to the 116th Congress (2019–2021).

[2]This number is based on 2019 one-year American Community Survey (ACS) data, U.S. Bureau of the Census (2019a), figured as the share of citizen voting-age population comprising those who are either Hispanic/Latino or from a non-white racial group.

[3]*See* U.S. Bureau of the Census (2019b); National Conference of State Legislatures (2020). Putting those sources together, the three exceptions are Arizona (34.4% minority citizen voting-age population vs. 38% minority legislators), Hawaii (73.2% vs. 76%), and Ohio (16.7% vs. 18%).

plaintiffs who wish to challenge existing maps under the VRA, that use is not our main focus.

We will use three main elements: a Markov chain procedure that proposes successive modifications to districting plans, an ecological-inference procedure that identifies minority-preferred candidates based on precinct-level historical election data matched to demographics, and a benchmark plan from which we can establish a presumptively acceptable number of effective districts.

Below, for our proof of concept, we will use a spanning-tree recombination procedure for the first element, a hierarchical Bayesian model for the second, and an enacted plan that has survived VRA scrutiny for the third[4]—but we emphasize that the main contribution of the current article is the overarching protocol, which is designed to be *modular*, letting users substitute in other alternatives to play these three roles. Combining these elements, our protocol defines *effective* districts for minority groups at any given threshold of confidence.

Article Outline. We begin in section 2 with a review of the burgeoning science of redistricting ensembles. Section 3 summarizes the legal rules governing the consideration of race and racial data in redistricting. Section 4 sets forth our VRA-conscious ensemble protocol, relying on recent election data to generate effectiveness scores that rate each district's likelihood of nominating and electing minority-preferred candidates. Section 5 applies this protocol to congressional redistricting in Texas, where both Latino and Black residents are numerous enough to require VRA attention. Section 6 applies techniques from statistics and machine learning to the Texas results to show the importance of using detailed electoral data. And section 7 concludes with a clear proof of concept showing that the long-standing underrepresentation of minority voters in Texas, far from being an immutable fact, can be addressed through proactive mapmaking.

Finally, we have made the corresponding software tools available for public use in our GitHub (MGGG Redistricting Lab 2020a) and through a user-friendly portal at districtr.org/VRA.

2. ENSEMBLE METHODS: ALGORITHMS FOR CREATING DISTRICTING PLANS

As Justice Kagan explained in her dissent in *Rucho v. Common Cause* (2019, 2517–23), a computer equipped with an algorithm that generates a huge number of redistricting plans could potentially create a baseline to help answer questions like:

- What is an extreme, or unfair, number of Republican (or Democratic) districts, given the partisan composition and political geography of the state's voters? or,
- What would be a typical number of competitive districts, given those same parameters? or,
- Given the new census data, can a plan comply with the "one person, one vote" principle without pairing two incumbents' homes in the same district?

And as we will soon demonstrate, an ensemble approach also can help us address questions like:

- What is a fair map for Latino and Black voters?

2.1. *Illustrative example: Iowa*

To see the power of redistricting ensembles, let's consider the case of Iowa. According to the 2010 census, Iowa's 99 counties contained 216,007 census blocks and 3,046,355 residents—enough for four congressional districts. Iowa's constitution simplifies the redistricting problem by mandating that "no county shall be divided in forming a congressional district," so drawing our four districts requires assigning only the 99 counties (Iowa Const. art. III, § 37). We might hope to approach the task of finding fair plans by first building all possible plans, and comparing a particular plan to the full set.

But even this modest problem of dividing 99 counties into four connected parts (four contiguous districts) is currently out of reach: no one has yet been able to find a precise answer for this problem by computer, even with a clever enumeration algorithm and a month of computing time.[5]

This problem is only compounded in most states, which build their districts from census blocks

---

[4]As described below, we use an implementation called GerryChain for plan generation, we use eiPack for ecological inference, and we use the current enacted Texas congressional map as our Voting Rights Act (VRA) benchmark.

[5]Indeed, even the simpler problem of partitioning a 9×9 grid into nine districts of nine units each has 706,152,947,468,301 solutions.

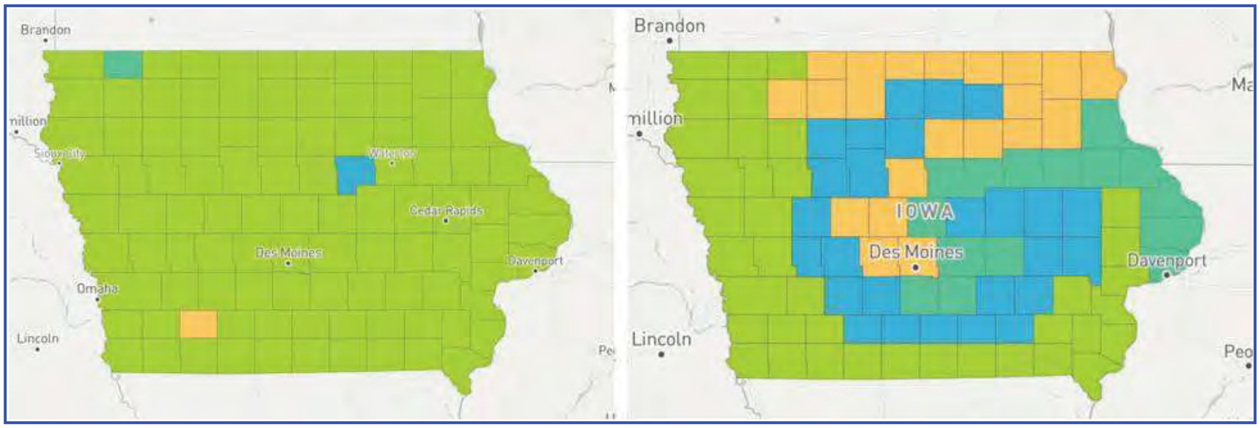


FIG. 1. These two partitions of Iowa into four connected pieces are not plausible for adoption as districting plans. The first has nearly all the state's population in a single large (*green*) district. The second more closely balances each district's population, but would likely violate Iowa law's compactness requirement.

(on average, there are more than 2,000 blocks per county). The full enumeration is subject to what is called *combinatorial explosion*, and the associated counting problem has forbidding complexity. This means not only that we lack the computing power to enumerate all plans today, but that computers likely will never be able to do so.

A second issue is that most plans in a complete enumeration would be irrelevant to the practical problem of redistricting because they would be blatantly unlawful. This is illustrated in Figure 1. The plan on the left, in which the biggest district has more than 750 times the population of the smallest one, would patently violate the federal Constitution's "one person, one vote" doctrine.[6] This means that districting plans with large population inequalities are of no practical interest, so a useful ensemble should exclude them.

The map on the right has much better population balance, but it also falls outside the plausible zone for plans. Its blue G-shaped district ("G" for gerrymandering) flaunts the mapmaker's disrespect for the traditional districting principle of compactness, which Iowa law explicitly safeguards (Iowa Code § 42.4.4).

Good ensemble methods allow us to draw a *representative sample* of compact, contiguous, population-balanced plans from the full space of possibilities—that is, a sample distributed in a known way that is suited to the law. By appealing to this sample, we can hope to address questions of partisan fairness, competitiveness, racial fairness, and all the other concerns and values we bring to bear on redistricting. To illustrate this methodology, we generated a sample of 100,000 valid Iowa congressional maps by the recombination method explained below in section 4.2, without taking partisan data into account.[7] This lets us compare the enacted plan against these alternatives in terms of votes cast for president in the November 2016 election, say. In our ensemble of compact, contiguous, population-balanced plans, nearly 75% have one safe Republican seat and three competitive seats (using a 55% majority as the line between competitive and safe). The current enacted plan has one heavily Trump-favoring district and three competitive ones, putting it in the largest category. This does not tell us by any stretch that the current plan is ideal or fair, but it does tell us that this plan is not an outlier by this way of measuring partisanship. This illustrates an elementary use of ensembles to benchmark partisan lean and competitiveness.

Similarly, ensembles can help us study how plans made without regard to race might tend to distribute a state's minority populations across districts, merely as a function of human geography. This

[6]A district-to-district population difference greater than 10% of the ideal district size is presumptively unconstitutional under the Fourteenth Amendment; for congressional districts, the standard is far stricter, under Article I of the Constitution (*Brown* v. *Thomson* 1983, 842–48; *Karcher* v. *Daggett* 1983, 730–44). The malapportioned plan in Figure 1 has top-to-bottom deviation nearly as large as the whole state, or close to 400% of ideal district size.

[7]ReCom always produces contiguous, balanced districts, and favors compact districts for reasons explained below in section 4.2.

racial baseline has been studied in a range of reports and papers, including MGGG Redistricting Lab (2018d, 2018a, 2019b, 2019a); DeFord and Duchin (2019); Duchin and Spencer (2021). But exploring the distribution of racial-group members in an ensemble is a different task from building an ensemble that takes VRA compliance into account. We will turn to that task shortly.

2.2. *Building ensembles*

Ensemble methods backed by powerful computers have proliferated in the last decade. Large ensembles of alternative plans proved critically important in federal-court cases invalidating extreme partisan gerrymanders in Ohio and Michigan (before the Supreme Court in *Rucho* held these claims nonjusticiable in federal courts) and more recently in similar state-court cases in Pennsylvania and North Carolina (*Rucho* v. *Common Cause* 2019, 2493–508; *League of Women Voters of Mich.* v. *Benson* 2019, 893–908; *Ohio A. Philip Randolph Institute* v. *Householder* 2019, 1025–62, 1082–85; *League of Women Voters* v. *Commonwealth* 2018, 770–81; *Common Cause* v. *Lewis* 2019, 17–43, 80–96).

Past ensemble methods used in litigation have focused on generating plans while controlling population balance, contiguity, compactness, and sometimes county and municipality integrity. Generating large ensembles while accounting in some way for these legitimate districting criteria helped judges decide whether one political party's disproportionate successes were due to the state's geographic features and the distribution of its voters—or to partisan manipulation of district lines. But in building their ensembles, the experts who testified in these cases did not seriously grapple with the legal requirements involving the consideration of race in redistricting.

In the Wisconsin case, for example, Democratic plaintiffs brought partisan-gerrymandering claims against a state Assembly plan that had resulted in Republicans winning 60 or more of the 99 seats, even in elections where Democratic candidates collectively received more votes than their Republican counterparts. In work prepared for the litigation and described in a subsequent article (Chen 2017), political scientist Jowei Chen built an ensemble of alternative Assembly plans to help evaluate the enacted plan and to demonstrate that the heavy advantage that Republicans enjoyed under that plan did not result inevitably from the political geography of the state's voters. Chen generated an ensemble of plans that altered boundaries for 92 of the 99 districts, while "freezing" seven heavily minority districts in and around Milwaukee, one of which had been ordered into effect to remedy a VRA violation.

Likewise, in the North Carolina cases, the experts' ensembles relied on proxies for districts' effectiveness for minority voters. For example, consider the work of one plaintiffs' expert, mathematician Jonathan Mattingly, as described in a subsequent article by his research group (Herschlag et al. 2020). Mattingly's work in North Carolina used demographic targets of 44.48% and 36.20% Black population for two congressional districts—the precise levels found in the enacted plan that the plaintiffs were challenging. He then built an ensemble by iterating a random step biased to favor plans that hit those demographic targets.[8] In addition to the effects of this tilted search, he discarded plans that fell short of those targets from the final ensemble presented in court, so that the prescribed population levels served as a minimum for all included plans.

In the context of these mid-decade partisan-gerrymandering cases, the experts' decisions to de-emphasize VRA complexities were understandable. The litigation, after all, focused on party, not race, and lawful VRA-compliant districts were already in place. But at the beginning of a new decade, with fresh census results available, that option will be foreclosed, as the minority districts from the previous map will have become either over- or under-populated due to population shifts and will thus violate "one person, one vote." So the minority districts (like all other districts) will have to be redrawn to accommodate the new census data. When generating alternative plans to create a baseline for comparison, redistricters will need to account for the delicate legal requirements imposed by the VRA and the Constitution.

For techniques that have been implemented to build VRA requirements into redistricting ensembles,

[8]Mattingly's method used a search procedure weighted to favor plans with better scores, based on a combination of population balance, compactness, county integrity, and nearness to his demographic targets for Black population.

the literature review is brief. In a new *Yale Law Journal* article called "The Race-Blind Future of Voting Rights" (Chen and Stephanopoulos 2021), Jowei Chen and legal scholar Nick Stephanopoulos take the problem of identifying suitable VRA districts head-on, defining a minority opportunity district by using a combination of partisan data (returns from the 2012 presidential general election) and demographic data (voting-age population from the 2010 census). In particular, they define a minority opportunity district to be one in which (1) the candidate of choice (typically Obama) carried the district in the general election and (2) most of the candidate's support is estimated to have come from minority voters. This is somewhat closer in spirit to the method proposed here, though this article draws dramatically different conclusions from theirs.[9]

Our method for measuring district effectiveness, described in section 4 below, will draw on a much larger collection of recent elections, pairing a primary with each general. The outcomes from these elections are the essential components of our effectiveness scores. And in section 6 we will show that the scores we develop cannot be well approximated by considering only a district's partisan lean and demographics.

2.3. *Using ensembles*

As we develop techniques for building VRA-conscious ensembles, there are two important general caveats about how and how not to use these ensembles.

Comparison, not selection. Our protocol is not designed to simulate the nuanced judgment of a seasoned voting-rights attorney. Rather, as we generate a chain of thousands of maps, we need a fast and reliable rough cut for VRA compliance. Our protocol uses a random iterative process in which districting plans are proposed, weighed, and potentially accepted into our ensemble of plans. We will be designing an in-or-out criterion that can be assessed in a fraction of a second. It is too much to expect perfection in excluding all unlawful maps and including all lawful ones, partly because the law itself is hardly a bright-line field. For example, even what seems like a rule with a clear threshold, such as the constitutional prohibition against state-legislative plans with population deviations greater than 10%, has exceptions in case law (*Cox* v. *Larios* 2004; *Unger* v. *Manchin* 2002). Nonetheless, an ensemble that includes most of the lawful maps that are proposed in the chain and rejects most of the unlawful ones will suffice for our goals of comparison and benchmarking. Ensembles should not be regarded as supplies of plans ready for immediate adoption; they are not likely to be good plans without extensive human vetting and adaptation.

Normal range, not ideal. We advocate using redistricting ensembles to learn a normal range for metrics and measures under the constraints of a set of stated redistricting rules and priorities. Ensembles allow us to justify statements such as *Plan X is an outlier in its partisan lean, taking all relevant rules into account*. While talking about normal ranges and outliers, we should avoid the temptation to valorize the top of the bell curve (or its center of mass, or any other value) as an ideal. By analogy, we can talk about people who are unusually tall or short without believing that any height is most desirable or ideal. If the 50th percentile height for American women is 5'4" and the 99th percentile height is 5'10," we can conclude that a woman who is six feet tall is unusual, and we can look for reasons (family history, diet, and so on) to explain her height. But it would be quite strange to decide that a woman who is 5'4" is a "better" height than one who is 5'5."

Justice Kagan's *Rucho* dissent skirted the edge of this temptation. She mostly reasoned from ensembles just as we will recommend here, envisioning a bell curve (in that case, of partisan advantage) and describing plans far from the bulk of the curve as presumptively impermissible: "The further out on the tail, the more extreme the partisan distortion and the more significant the vote dilution" (*Rucho* v. *Common Cause* 2019, 2518). But in the course of describing the outlier logic, she implied that plans "at or near the median" are the best of all. An outcome "smack dab in the center" (in Justice Kagan's words) may not be in any sense the most fair, however. For instance, turning to the November 2012 Obama-Romney election as a touchpoint, Obama received nearly 53% of the major-party vote in Iowa. Even if just over half

[9]For their method's details, see the full description in Chen and Stephanopoulos (2021). For a critique of their definition of minority opportunity districts and its application, see Duchin and Spencer (2021).

the congressional plans in our ensemble have three Obama-favoring districts out of four (making that the median outcome), we might still reasonably consider a map with two Obama-favoring and two Romney-favoring districts to have at least as strong a claim on fairness, given the nearly even vote split.

Likewise, there would be no reason to prefer a map that preserves intact a *median* number of whole counties or municipalities. Indeed, some states' redistricting laws expressly demand keeping the greatest practicable number of counties or municipalities intact.

The same warning, to be wary of the magnetic attraction to the middle of a bell curve, surely applies as well to racial fairness. If a state's Latino, Black, Asian American, and Native American residents have historically been (and currently remain) underrepresented, we should gravitate toward solutions that fix the shortfall rather than perpetuate it. Fortunately, federal law pushes redistricters in the right direction.

3. THE LAW OF RACE AND REDISTRICTING

The rules regarding the consideration of race in redistricting flow primarily from two sources of federal law: the Fourteenth Amendment's Equal Protection Clause and Section 2 of the Voting Rights Act, which Congress, exercising its power to enforce the Fifteenth Amendment, enacted in 1965 and significantly revised in 1982.

3.1. The Voting Rights Act prohibits minority vote dilution

Section 2 of the VRA prohibits a redistricting plan that abridges any citizen's right to vote "on account of race or color [or membership in a language-minority group]" (VRA §§ 10301(a), 10301(f)(2)). Minority plaintiffs can establish a violation of amended Section 2 by showing, "based on the totality of circumstances," that members of their racial or language-minority group "have less opportunity than other members of the electorate" to "nominat[e]" and "elect representatives of their choice" (VRA § 10301(b)).

In assessing whether a redistricting plan provides equal electoral opportunity under amended Section 2, Congress expressly permitted state redistricters and federal judges alike to consider recent election outcomes, namely "[t]he extent to which members of a protected class have been elected to office" (VRA § 10301(b)). Nothing in Section 2, however, "establishes a right to have members of a protected class elected in numbers equal to their proportion in the population." While electoral success for minority candidates is important, even more important under Section 2 is that the candidate be the "chosen representative" of a particular racial or language-minority group, regardless of the candidate's race or ethnicity (*Thornburg* v. *Gingles* 1986, 68 (plurality opinion)). And Section 2's lodestar is "equality of opportunity, not a guarantee of electoral success for minority-preferred candidates of whatever race" (*Johnson* v. *De Grandy* 1994, 1014 n.11). As the Supreme Court has explained, "minority citizens are not immune from the obligation to pull, haul, and trade to find common political ground, the virtue of which is not to be slighted in applying a statute meant to hasten the waning of racism in American politics" (*Johnson* v. *De Grandy* 1994, 1020).

In redistricting cases "the ultimate question [under Section 2] is whether a districting decision dilutes the votes of minority voters" (*Abbott* v. *Perez* 2018, 2332). District lines can dilute the voting strength of politically cohesive minority-group members either by "cracking," or dispersing, them among multiple districts where they are routinely outvoted by a bloc-voting majority, or by "packing," or concentrating, them into too few districts, wasting votes that could have mattered in neighboring districts (*Johnson* v. *De Grandy* 1994, 1007). Section 2 prohibits both cracking and packing whenever district lines combine with social and historical conditions to impair the minority group's ability to elect its preferred candidates "on an equal basis with other voters" (*Voinovich* v. *Quilter* 1993, 153).

In jurisdictions where all sizable demographic groups (majority and minority alike) consistently favor the same candidates, a redistricting plan cannot dilute minority citizens' voting strength, so Section 2 plays no role (*Thornburg* v. *Gingles* 1986, 51). But in most states, where voting is in varying degrees racially polarized, Section 2 can require replacing one or more districts that elect candidates preferred by the majority (usually, a white majority) with districts that would elect candidates preferred by one or more minority groups (*Johnson* v. *De Grandy* 1994, 1008). To prevail, Section 2 plaintiffs must prove that, under the challenged plan, a bloc-voting majority usually will defeat "candidates supported by a politically cohesive, geographically insular minority group" (*Thornburg* v. *Gingles* 1986, 49). But even with such proof, plaintiffs' challenge to a state districting plan ordinarily will fail if the plan provides effective opportunities to nominate and elect minority-preferred candidates in a number of districts *roughly proportional* to the minority group's share of the state's citizen voting-age population, or CVAP (*LULAC* v. *Perry* 2006, 436–38; *Johnson* v. *De Grandy* 1994, 1000).

One particularly useful—and simple—method for assessing minority electoral opportunities under a districting plan is to add up the votes cast for each candidate in recent *statewide* primary and general elections by district, to learn which districts gave more votes to the minority-preferred candidate than to any other candidate (*LULAC v. Perry* 2006, 428 (majority opinion), 493–94, 499–501 (Roberts, C.J., dissenting in part); *Session v. Perry* 2004, 499–501). This approach is particularly straightforward if each precinct is kept intact within a single district: simply adding up the votes for each candidate in all of a district's precincts shows, for each election, which candidate carried the district. The most difficult part of these analyses, especially in primaries, is identifying the candidate who was minority-preferred in each election, which is typically performed by a statistical-inference procedure comparing demographic patterns to voting patterns (King 1997; King, Rosen, and Tanner 1999; Elmendorf, Quinn, and Abrajano 2016). But we will take care to place actual electoral history at the center of our assessment of district effectiveness, keeping the role of statistical inference to a minimum.

3.2. The Equal Protection Clause prohibits excessive attention to race

Regardless of what techniques are used to assess minority electoral opportunities, compliance with Section 2 necessarily requires detailed consideration of race and racial data. But a state's consideration of race is constrained by the Fourteenth Amendment mandate that "[n]o State shall … deny to any person within its jurisdiction the equal protection of the laws" (U.S. Const. amend. XIV; see *Bethune-Hill* v. *Virginia State Bd. of Elections* 2017, 802). Starting in the 1990s in its *Shaw* line of cases, the Supreme Court has identified at least two ways that the excessive use of race can give rise to a presumptively unconstitutional *racial gerrymander* under the Equal Protection Clause (*Miller* v. *Johnson* 1995, 904–05, 910–17; *Shaw* v. *Reno* 1993).

First, a bizarrely noncompact district is subject to strict scrutiny under that Clause if the district's boundary is "so irrational on its face that it can be understood only as an effort to segregate voters into separate voting districts because of their race" (*Shaw* v. *Reno* 1993, 658). This type of racial predominance most often arises where a district's perimeter is defined not by the boundaries of intact precincts, for which electoral data exists, but by the boundaries of (much smaller) census blocks that have been conspicuously sorted into or out of districts according to their racial composition (Hebert et al. 2010, 66–68 & n.21; *Alabama Legislative Black Caucus* v. *Alabama* 2015, 274).

Second, although only a minority of justices have stated that the intentional creation of a majority-minority district should always be presumptively unconstitutional, a majority of the Court has held that districts violated the Equal Protection Clause because they were drawn to "maintain a particular numerical minority percentage" or to meet arbitrary or "mechanical racial targets." The Court has thus rejected a bald mandate that certain districts must have at least a 50% or a 55% Black voting-age population regardless of whether that percentage was actually shown to be necessary for the district to nominate and elect minority-preferred candidates (*Cooper* v. *Harris* 2017, 1469; *Bethune-Hill* v. *Virginia State Bd. of Elections* 2017, 799, 801–02; *Alabama Legislative Black Caucus* v. *Alabama* 2015, 267, 275; *Bush* v. *Vera* 1996, 969–72).

3.3. Implications for redistricting ensembles

These legal points have major implications for an ensemble-creation protocol keyed to compliance with the VRA and the Constitution. As an initial matter, recalling the earlier point about ensembles being far more useful for comparison than for selection, the focus here is on drawing a collection of maps that would be relatively safe from challenges under VRA Section 2, rather than on crafting a map for plaintiffs to propose when suing the state.

As a gatekeeping function before ultimately assessing the "totality of circumstances," courts generally require Section 2 plaintiffs to present an illustrative map showing that the minority group in question could constitute a literal arithmetic majority of the voting-age population (VAP) in a proposed district.[10] The Supreme Court has noted, however, that a district that falls short of the 50% threshold yet can still nominate and elect minority-preferred candidates "can … [and] should" count as a minority-effective district when assessing a state's compliance with Section 2 (*Bartlett* v. *Strickland* 2009, 24 (plurality opinion); see also *Cooper* v. *Harris* 2017, 1470). So actual electoral opportunity for minority groups—a track record of effectiveness in elections—is what matters when defending a map against a VRA challenge. Taken together, the legal points elucidated above in sections 3.1 and 3.2 suggest three crucial design principles for a VRA-conscious ensemble protocol.

(1) *Ensure effectiveness in both primaries and generals.* Aiming to weed out of an ensemble plans that violate Section 2, while retaining plans that comply, a protocol must assess whether particular districts will or will not be effective for minority-preferred candidates seeking both nomination (in primaries) and election (in generals). This assessment requires attention to both demographic data and actual election results, including precinct-level returns from primary and general elections.
(2) A*void* a priori *demographic targets.* Threshold decisions about the composition of districts should not be based on purely demographic targets—for example, requiring a certain number of districts that are at least, say, 55% Latino or 50% Black. That approach not only could lead to false positives or false negatives for district effectiveness, but could leave the methodology vulnerable to constitutional attack for excessive race-consciousness.
(3) *Maintain reasonable compactness.* To further reduce constitutional exposure, the ensemble-generating technique should admit few or no plans with bizarre district shapes.

We note that both the first and the third principles recommend the use of precincts, rather than the much smaller census blocks, when assembling districts. Precinct-based plans promote compactness and facilitate more accurate assessment of electoral history, which is fundamental to evaluating district effectiveness. And though they may not achieve perfect population equality, that fact usually should not present significant constitutional concerns.[11]

4. DESIGN OF A VRA-CONSCIOUS ENSEMBLE PROTOCOL

In this section, we will describe the design of a protocol for generating redistricting plans that comply with not only the criteria of population equality, contiguity, and reasonable compactness, but also the race-related rules mandated by the VRA and the Equal Protection Clause. The protocol begins with data preparation and culminates in the use of a constrained recombination algorithm for generating plans that meet VRA-related requirements. We propose this as a sound and detailed *VRA-conscious algorithm*, but not as *the authoritative VRA algorithm*. There may well be other ways to incorporate the legal requirements around race, and to do it well. But the methods laid out in this section come closer to the big-picture goal—building a representative sample of lawful maps—than any previous work we know. We believe that this elaborated example of one concrete, reasonable way to take account of race and the law helps illuminate some key decisions.

We recall from above that the protocol is modular with respect to three ingredients: a procedure for iteratively modifying districting plans (here, spanning-tree recombination), a procedure

[10]*See Bartlett* v. *Strickland* (2009, 6, 9–11, 20, 24–25, 26 (plurality opinion)). *Bartlett* also may be satisfied with a majority of the proposed district's *citizen* voting-age population (CVAP). And *Bartlett*'s 50% rule may not apply if the defendant drew the challenged districts with discriminatory intent, as might well be the case when a state dismantles an existing minority-effective district.

[11]Using whole precincts will rarely raise "one person, one vote" concerns for state-legislative maps. However, the Constitution imposes stricter population-equality standards for congressional maps (*Karcher* v. *Daggett* 1983, 740-41). Although the most common current practice is to draw congressional plans so that the largest and smallest districts differ by only one person, the Supreme Court has upheld plans with significantly larger deviations (*Tennant* v. *Jefferson County Comm'n* 2012, 762, 764–65; *Abrams* v. *Johnson* 1997, 99–100). In any event, a map built from whole precincts can usually be readily modified into a map with a minimal deviation by swapping a limited number of census blocks between adjacent districts.

for identifying minority-preferred candidates (here, a Bayesian hierarchical model of ecological inference), and a benchmark that prescribes a threshold number of effective districts for each minority group (here, an enacted plan that has evaded or withstood VRA scrutiny). Our choices can be swapped out for others as new methods or special circumstances warrant, leaving the overall structure intact.

4.1. Preparing data

4.1.1. Electoral and demographic data. We will require a cleaned precinct *shapefile* for the state, with election returns and demographic data joined to those precincts.[12] This can be difficult to obtain because precincts change from year to year and a longitudinal precinct shapefile is needed for the span of years covered by the election dataset. Furthermore, we may need to clean the precinct shapes to get suitable topology: to be usable as building blocks for plans, precincts must tile the state, with every resident located in one and only one precinct.[13]

The shapefile allows us to match reported vote totals to geographic units and to record which pairs of precincts are adjacent, which will be needed to ensure that districts are contiguous. For each precinct, we have joined data on total population from the 2010 decennial census, adult citizen population by race and ethnicity from the American Community Survey (ACS) five-year rolling estimates ending in each election year, and counts of votes received by each candidate for statewide election in a large set of primary and general elections.

Although our modeling concern is with districted elections for Congress and state legislatures, our analysis is based primarily on statewide (exogenous) contests. This is because the choices facing voters in districted elections vary across the state: in any given election year, some districts are uncontested, some have strong incumbents or other idiosyncrasies. When district boundaries are moved to create alternative plans, the newly proposed districts will be composed of voters who faced completely different candidate choices. It is not clear how votes for one candidate would translate to votes for a different candidate. By contrast, statewide elections allow us to make apples-to-apples comparisons across different parts of the state, since the same set of candidates competed everywhere. Ideally, we would include all statewide contests for the last ten years, but this is not always possible because of data availability and precinct instability. As we will discuss further below, this protocol is not intended for use with fewer than five general elections, grouped with the primaries (and, where applicable, primary runoffs) that preceded them.

Because our main concern here is whether minority-preferred candidates are ultimately elected to office, we *link* the primary (and primary runoff) for a given office in a given year to the general election for that same office that same year, and define success by whether the candidate who was minority-preferred in the primary succeeded at all stages of the electoral process.

We use a simplified set of racial groups: every person who identified as Hispanic/Latino on the census or ACS is classified as *Latino*. We use the term *Black* for non-Hispanic respondents who selected Black as their single racial category, and we use *White* similarly. All other respondents (those non-Hispanic persons selecting two or more races, Asian American, Native American, and so on) are grouped together and designated as *Other*. In a state with only one sizable minority group, all other minority groups may be merged into the Other category for purposes of this VRA protocol. Citizen voting-age population is denoted by CVAP, and we use HCVAP, BCVAP, WCVAP, and OCVAP to denote Hispanic/Latino, Black, White, and Other CVAP. We focus on Latino and Black voters as minority groups because our main case study involves congressional redistricting in Texas. In other states, like California, Hawaii, or Alaska, or in certain local districting projects, we might specify different racial groups for analysis.

Importantly, we make no prior assumptions about whether the voting behavior of Latino, Black, White, or Other groups will align. This is a case-by-case empirical question addressed with statistical inference.

4.1.2. Candidates of choice. As explained above, the linchpin of a vote-dilution claim under

[12]Shapefiles store data about the position and attributes of a geographic unit, such as a precinct.

[13]Cleaned and vetted shapefiles that are suitable for longitudinal data are easier to create in some states than others. For instance, the Louisiana shapefile used in this study required hundreds of person-hours of data preparation from members of the MGGG Redistricting Lab. It would be extremely difficult to obtain an analogous data product in Mississippi, for example.

the VRA is the right to replace districts where minority-preferred candidates usually lose with districts where they have a realistic opportunity to win (*Johnson* v. *De Grandy* 1994, 1020). To assess whether a district falls into the former category or the latter requires determining which candidates are preferred by members of each sizable minority group.

Because vote totals are not reported by racial group, we cannot directly determine which candidates are minority-preferred. Instead, this effort falls under the umbrella of *ecological inference* (EI). Voting preferences are never monolithic, but techniques for measuring racial polarization have been refined for decades, and they can help us estimate the degree of bloc voting. The techniques in the ecological-inference family, like all statistical-inference methods in the presence of missing data, give imperfect and uncertain answers (Elmendorf, Quinn, and Abrajano 2016). It is fundamentally important to estimate the error that is produced by techniques and keep track of how it compounds or cancels out in our high-level conclusions. As much as possible, we will opt to make gradated and not bright-line determinations from the outputs of EI.

Our VRA-conscious ensemble protocol requires identifying the candidate who was preferred by each sizable minority group in each election, together with confidence measures that these preferred candidates are correctly identified. To perform the check for minority control of a district, as well as to identify district-wide candidates of choice for newly proposed districts, we make use of not only statewide but also precinct-level vote estimates by race for each candidate (with variance estimates). Users can employ various methods to generate these estimates (e.g., using King's EI, Ecological Regression, exit polls, or voter files). Notably, this allows our protocol to immediately incorporate any future advances in inference techniques.

In the implementation described here, we generate estimates using a version of King's EI, specifically the ei.MD.bayes function from eiPack (Lau, Moore, and Kellermann 2020) which is based on the Bayesian hierarchical Multinomial Dirichlet model for $R \times C$ tables proposed in King, Rosen, and Tanner (1999).[14] For each election we run EI at the statewide level, using precinct-level input tables. The inputs for each precinct are the row and column *sums* for the $R \times C$ table of vote counts. The row sums correspond to the precinct's estimated number of adult citizens in each racial group (HCVAP, BCVAP, WCVAP, and OCVAP). The column sums are the precinct's vote totals for each candidate as well as a *None* count, which is the sum of the four CVAP figures minus the sum of the recorded vote totals for all candidates, estimating the number of nonvoters. EI then infers values for the internal cells of these tables, i.e., estimated vote counts by racial group and candidate. Inclusion of the *None* column allows the underlying model to estimate differential turnout by race; without this, EI would rely on the unrealistic assumption that adult citizens from all demographic groups were equally likely to have cast a ballot.

Each EI run generates a large random sample of estimated precinct vote counts; we can sum these across the entire state to get statewide estimates. For each racial group, the candidate with the highest average estimated vote total for a given election is identified as the group's "candidate of choice." For a measure of confidence that Candidate X was the candidate of choice for a racial group in a given election, we first take repeated draws from the EI distribution and record the frequency with which X receives the most votes from that group. We then transform this to a confidence score.[15]

[14]Here, $R \times C$ stands for the number of rows (or racial groups) R and columns (or candidates) C.

[15]Let p be the frequency in a batch of trials with which X is observed to be the preferred candidate. We logistically transform this to a confidence score using $C(p) = 1/(1 + \exp(18 - 26p))$ to weight the election in the compound score of district effectiveness (see Table 1 below). The parameters 18 and 26 were chosen so that an election in which the draws have Candidate X ahead only 50% of the time should receive almost no weight (because it is a toss-up); but if Candidate X comes out ahead in, say, 85% of trials, the confidence should be nearly 100%. It is certainly possible to use other parameters, to skip this step and just use $C(p) = p$ as a measure of confidence, or even to forgo confidence altogether. Without some factor of this kind, however, the resulting score will have more noise due to cases where the candidate of choice is uncertain. If we do not strongly down-weight the uncertain elections, we risk a situation in which just rerunning the EI with identical settings could produce a significantly different answer. We discuss this and other robustness checks in footnote 31.

4.2. Building new plans by recombination

The science of representative sampling has advanced greatly in the past few years as ensemble methods for redistricting have matured. Using a technique known as *Markov chain Monte Carlo* (MCMC), it is now possible to efficiently create an ensemble of thousands or millions, even billions, of plausible maps. We can even sample while keeping control of the weighting that makes some kinds of plans appear more often than others. For example, we can be sure that a preference for more compact plans is designed to depend *only* on a prescribed score of compactness and on no hidden factors.[16]

The engine of our district-generation process is a Markov chain known as recombination, abbreviated ReCom, whose central idea of using spanning trees to split districts is fast becoming the standard in the field (DeFord, Duchin, and Solomon 2021; Autrey et al. 2021; McCartan and Imai 2021). We will apply it to plans built from whole precincts, the smallest geographic units for which we have accurate, detailed electoral data. Earlier MCMC methods for redistricting reassigned a single geographic unit (such as a precinct) from District A into adjacent District B at each step, creating a new plan that agreed with its predecessor on the assignment of every unit except one. (If Texas, for example, had 9,000 precincts, 8,999 would stay in their districts at each step.) By contrast, ReCom typically proposes a much larger change: at each step, two entire (adjacent) districts are merged and then re-split in a new way that is completely independent of the division in the previous plan. This means that a single ReCom step can reassign hundreds of precincts at a time. (Each of Texas's 36 congressional districts, for instance, has roughly 9,000/36, or 250, precincts, so each recombination step performs a random division of roughly 500 precincts into two new districts.) By iterating this transformation hundreds of times per minute, the map soon loses any resemblance to its starting configuration.

A ReCom step merges a random pair of adjacent districts and splits the region in a new way. Under the hood, each ReCom step uses a *spanning tree*, which is a kind of "skeleton" of the double-district created by the random merger, and then searches for a place to cut that tree to leave behind two population-balanced, connected pieces. So, by construction, all plans proposed by recombination are contiguous and maintain the desired population balance. What is less obvious is that ReCom's use of spanning trees also places an automatic priority on districts that have more internal adjacencies: so *compactness*, or a preference for plump, regular forms over thin necks or stringy appendages, is also a structural feature of the algorithm (see Figure 2) and does not have to be set as a manual choice by the programmer (DeFord, Duchin, and Solomon 2021). In fact, when the district boundaries of a plan generated by ReCom look ragged to the eye, it is often because the building-block units themselves (such as precincts) have jagged edges.[17]

Over thousands or millions of iterations, this simple method can undertake far-reaching exploration of the universe of possible plans subject to population balance, contiguity, and reasonable compactness. We will call a set of plans collected in a recombination chain an *ensemble* of plans.

Additional features and constraints can be incorporated into ReCom either with hard thresholds (i.e., validity checks) or by using probabilistic acceptance. To illustrate this, consider the traditional districting principle that counties should be kept intact when practicable. We could enforce a maximum allowable number of county splits by adding an instruction to automatically reject as invalid any proposed plan that exceeds some level of county-splitting, creating a *constrained* ensemble. A different option would be to impose a bias to the probability of acceptance, essentially flipping a weighted coin each time a proposal is generated that makes it rare but not impossible to accept plans with a large number of county splits. This would create a *biased* (or *tilted*) ensemble favoring fewer county splits.

When a proposed plan is rejected, a new plan is proposed by merging and re-splitting a freshly

[16]To be precise, the recombination algorithm used here approximately targets a known distribution called the *spanning-tree distribution*, where the probability of selecting a particular plan is proportional to a certain measure of compactness. A modified algorithm called *reversible recombination* exactly targets that steady state. See DeFord, Duchin, and Solomon 2021; Duchin and Tenner 2018; Sarah Cannon, Moon Duchin, Dana Randall, and Parker Rule 2020. "A Reversible Recombination Chain for Redistricting." On file with authors.

[17]The reasons spanning-tree partition methods produce compact districts are explored in Duchin and Tenner (2018) and DeFord, Duchin and Solomon (2021).

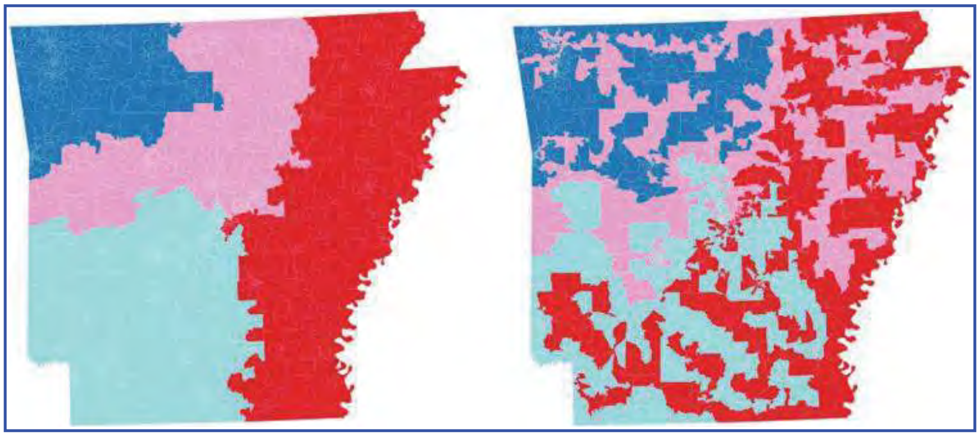


FIG. 2. If all contiguous, population-balanced plans were made equally likely, the compact plans (*left*) would be enormously outnumbered by bizarrely noncompact ones (*right*). The ReCom algorithm prefers the compact one, with a relative weight dictated *only* by its compactness score.

chosen pair of adjacent districts. This continues until some proposed plan passes the necessary tests to be accepted, at which point it is added to our ensemble. The next step proceeds from this newly accepted map, and so on until the Markov chain reaches its stopping condition (such as by collecting a prescribed number of plans). Our ensembles contain every valid plan rather than *sub-sampling*, or thinning out by accepting only every 1,000th or 10,000th plan as previous authors have done (Herschlag et al. 2020; Fifield et al. 2020). The long-range statistical properties are the same whether we use continuous sampling or sub-sampling, and we employ standard convergence heuristics from the scientific computing literature to provide evidence that our chains are run long enough for the statistics we collect to approach stationarity.[18] For more information about spanning-tree recombination and for comparisons to other methods, see DeFord, Duchin, and Solomon (2021); Becker and Solomon (2021); DeFord and Duchin (2020); McCartan and Imai (2021); and Autrey et al. (2021).[19]

Below, we will refer to district-level as well as statewide EI estimates as we build scores of district effectiveness. The district-level procedure requires some thought because of the computational cost of any calculation that occurs while the algorithm runs, rather than being performed in advance. It is not feasible to rerun EI to determine district-level candidate preferences with each newly proposed plan in a ReCom chain. We need a highly efficient calculation to retrieve both a point estimate and an estimated confidence level when a new district is formed. To handle this, we make use of the hierarchical structure of EI. The EI algorithm generates large random samples for each precinct from the distribution of possibilities produced by the underlying Bayesian model. This means that we can store outputs for each precinct in the state. Ideally, we would save the full *detailed histogram* describing the frequency with which various vote counts were estimated for each candidate and racial group in that precinct. Because this is too much information to store, we instead record the point estimate for each group's support of each candidate in addition to a simplified coarse histogram of vote counts, compressed down to just nine values, which turns out to be enough to recover the shape of the detailed histogram with remarkable fidelity, as shown in Supplementary Appendix A. During the run of the ReCom Markov chain, we can redraw samples from these coarse distributions and aggregate to the district level for each newly generated plan to determine the confidence that we have correctly identified candidates of choice.

4.3. Building raw scores of district effectiveness

We next lay out three ways to use prior election results in assigning a minority-effectiveness score

---

[18]Markov chains that take large steps, like ReCom, require many fewer steps to achieve approximate independence than methods that iterate very small changes.

[19]See also Sarah Cannon, Moon Duchin, Dana Randall, and Parker Rule 2020. "A Reversible Recombination Chain for Redistricting." On file with authors.

to a proposed district: an unweighted score, a score that weights elections based on statewide voting patterns, and a score that weights elections based on voting patterns restricted to the proposed district itself. We will denote these scores by s^{unw}, s^{state}, and s^{dist}, respectively. Although election-weighting schemes differ across the three effectiveness scores, each score captures the same underlying idea: the effectiveness of a district for a minority group is keyed to the district's history of voting for minority-preferred candidates running for statewide offices. Importantly, because our districts are built from whole precincts and we have prior election results matched to those precincts, no statistical inference is required to determine which candidate prevailed in each district. We simply total up the votes cast in the district for each candidate and note which candidate got the most support.

First, we need to settle on the meaning of a successful outcome for the voters of a minority group in a particular election and district. If the candidate of choice from the primary does not advance to the runoff or general, then the outcome of the general is less informative with respect to the group's preferences. Therefore, we group elections by pairing primary and general (or grouping primary–runoff–general if applicable) as Table 3 illustrates for our Texas case study. A successful election is one in which the minority-preferred candidate in the primary prevailed in both elections in the grouping (or all three, if there was a primary runoff).[20]

Our weighting scheme is keyed to the *probative* value of each statewide election in determining minority effectiveness—its value as evidence. The unweighted score treats each election equally; no election is considered more probative than any other in determining a district's effectiveness. By contrast, the statewide weighted score s^{state} and the district weighted score s^{dist} treat some statewide elections as more probative than others and weight them accordingly. These *election weighting factors* each fall on a scale from zero to one. Their product is the final weight for an election. In keeping with case law, we up-weight elections if they have certain features:

- *Recent.* More recent elections provide stronger evidence of future electoral opportunity.
- *Clear candidate of choice.* As described above in section 4.1.2, our ecological-inference outputs come with estimates of the probability that the minority-preferred candidate in the primary election has been correctly identified. Translating this to a *confidence* that EI has identified the correct candidate gives greater weight to elections in which the minority group has a clearly preferred candidate.
- *Group member preferred.* An outcome gives stronger evidence of electoral opportunity when the minority-preferred candidate is a member of the particular minority group.

The weighting factors are summarized in Table 1. We discount elections for each year of age by a multiplicative factor of $2^{-1/4} \approx .841$, so that if any one election is four years older than another, it weighs half as much. The confidence that we have correctly identified the minority-preferred candidate is the same confidence score $C(p)$ described above (see footnote 15), using draws at the state level for s^{state} and drawing from the district-level coarse histogram for s^{dist}. When gauging Latino effectiveness, we place twice as much weight on elections in which the Latino-preferred candidate is Latino; and the analogous statement holds for other minority groups. Of course, these detailed weights are choices made by the modeler. We will introduce a calibration step for our effectiveness scores in the next section that makes our outputs more robust to these parameters, and we tested this by re-running the protocol several times with slightly different choices (see footnote 31).

These weighting factors are important for the legal interpretation we intend. More recent elections are up-weighted because the predictive value of election results tends to erode over time, as older voters pass away, younger citizens reach voting age, immigrants are naturalized, people move into or out of the district, and voters change their

[20]To be precise, suppose the primary candidate of choice is Candidate X and the runoff candidate of choice is Candidate Y (who might or might not be the same person as Candidate X). Then there are three cases we count as primary success. Case one: X won the primary (in the district) and there was no runoff. Case two: X received over 50% of the vote in the primary (in the district), whether or not there was a runoff. Case three: X ranked first or second in the primary (in the district) and Y won the runoff (in the district). An election set that meets one of these primary-success conditions and in which the minority-preferred nominee wins the general election in the district is counted as a successful election in the scores below.

Table 1. Weighting Factors for Effectiveness Scores

Score/Factor	*Recent*	*Clear candidate of choice*	*Group member preferred*
Unweighted (s^{unw})	1	1	1
Weighted/Statewide (s^{state})	1 Most recent .841 1 year prev. .707 2 years .595 3 years .500 4 years .421 5 years, etc.	Confidence from statewide EI	1 X belongs to group, .5 otherwise
Weighted/District (s^{dist})		Confidence from district-level EI	

The weighting factors for the unweighted, statewide, and district-based effectiveness scores (s^{unw}, s^{state}, and s^{dist}, respectively). All of these are computed with respect to the primary election in an election set, because the runoff and general may not contain the most-preferred candidate for the minority group. Here, Candidate X is the minority group's candidate of choice. These factors will be combined into an election-weighting term w for all elections in the dataset.

political preferences and behaviors. Confidence in correctly identifying candidates of choice is clearly pertinent, because a wrongly identified candidate of choice undermines all subsequent conclusions we will draw. Elections where the minority-preferred candidate belongs to the minority group in question are up-weighted because they are more probative: in the words of the late Judge Richard Arnold, the VRA's guarantee of equal opportunity is not met when "[c]andidates favored by [a minority group] can win, but only if the candidates are white" (*Smith* v. *Clinton* 1988, 1318).

We now have all the ingredients for the raw effectiveness score for a given district and racial group, multiplying the three factors above to get a weight $w = w(E, D)$ for each election and district. For instance, if we have 20 elections, then each w will be .05 for the s^{unw} score, no matter the election. For the statewide score s^{state}, the elections will not all count equally, so that, for example, a recent election with an in-group candidate will weigh four times as heavily as a four-year-old election with only white candidates.

Each effectiveness score is computed similarly:

$$\text{score of district } D = s(D) = \sum_{E \in \mathscr{E}} w \cdot \delta$$
$$= \text{weighted share of elections won by candidate of choice,}$$

where δ is 1 if the minority-preferred candidate carried the district and 0 otherwise. This expression applies to all three kinds of effectiveness scores $s = s^{\text{unw}}, s^{\text{state}}, s^{\text{dist}}$. For example, suppose there are two election groupings separated by four years, both have equal confidence weights and feature group members, and the candidate of choice is successful in one of those two election sets. Then the statewide and district raw scores of effectiveness would be 1/3 if the success was in the earlier election and 2/3 if the success was in the later election, while the unweighted score would be 1/2. The strength of using an approach that centers on electoral effectiveness rather than demographics is that we do not make evidence-free assumptions about how large a Latino population is needed to nominate and elect Latino-preferred candidates, or similarly for other minority groups. Rather, we directly and empirically answer that question by totaling up votes, district by district. Our direct, empirical approach is better keyed to actual minority electoral opportunities, and so also comports better with federal law. The VRA's plain text does not equate a minority-effective district with a majority-minority district; rather, it demands an assessment of whether minority citizens have an equal opportunity to "nominat[e]" and "elect representatives of their choice." And our empirical approach also respects the Equal Protection Clause's prohibition against relying on racial-percentage targets when drawing districts.

4.4. *Calibrating effectiveness scores*

The raw effectiveness scores described above combine election results in three different, reasonable ways. Each score ranges from zero (never electing minority-preferred candidates) to one (always electing them). We next convert these to calibrated scores that we will use when deciding whether to accept plans into the ensemble.

At this stage, we take a *group-control factor* into account, combining it with the raw effectiveness score because it is relevant to predicting future performance and to ensuring an emphasis on electoral success for larger numbers of minority voters. It is clear from redistricting case law that majority-minority districts are not required for VRA compliance, and indeed that setting out to draw districts with a demographic target is sometimes prohibited. At the same time, a district that has only 5% Black CVAP would not be reasonably viewed as an effective opportunity district for Black voters, on par with a district with more significant Black population. We have chosen to address this issue with a factor based on the minority group's share of district CVAP.[21] Group control of the district is relevant for two reasons. First, Section 2 of the VRA focuses on a minority group's ability to play a controlling or "decisive … role in the electoral process" and not merely one of "influence" (*LULAC* v. *Perry* 2006, 446 (plurality opinion) (citation and quotation marks omitted)). Second, because Section 2 protects the voting rights of a minority group's individual members, the effectiveness of a district should in part depend on the number of those members represented by their candidate of choice.

The goal of the calibration step is to bolster the *probabilistic* interpretation of the scores, so that, for example, a district with $s = .5$ can be described as having a 50/50 chance to perform for the minority group under consideration. To lend justification to this probabilistic interpretation, we apply a standard logistic regression to normalize the raw scores based on observed success data from actual enacted districts (specifically, all congressional, state Senate, and state House elections in the last decade).[22]

By design, the calibration step helps ensure that although the elections that are used in constructing the raw effectiveness scores are statewide contests, they still reflect election outcomes in *local* (districted) elections. We think of the logistic transformation as producing a score that best captures the observed performance of congressional, state Senate, and state House districts in the last decade. Each input (raw) score falls between zero and one; after applying the logit function we obtain an output (calibrated) effectiveness score that still falls between zero and one, but is now easier to interpret. We will reuse the same notation s^{unw}, s^{state}, s^{dist} for the outputs, taking care to refer to the scores as raw or calibrated when there is a possibility of confusion.

4.5. *Counting effective districts*

To assess whether a proposed plan complies with the VRA, we will need to count effective districts, and not just report scores. We elect to define a *Latino-effective* (or *Black-effective*) district as one whose calibrated effectiveness score estimates at least a certain threshold chance of both nominating and electing a Latino-preferred (or Black-preferred) candidate.

This threshold is a parameter to be set by the modeler, and it may involve considerable discretion. One consideration may be the mapmaker's level of risk aversion, since setting a lower threshold may result in a higher number of qualifying districts that can be simultaneously drawn, but some or all of those districts will be less certain to nominate and elect minority-preferred candidates. A second consideration may be how particular districts in the current enacted map have been characterized by judges and victorious litigants in prior redistricting litigation, or how they have actually performed in prior elections. A third consideration may be the number of statewide elections in the dataset: we may choose a higher effectiveness threshold if we have a smaller set of available elections, to account for the possibility that the signal from any single election is misleading.

In our Texas case study below, we have adopted the threshold condition $s > .6$—that is, to be deemed an *effective district*, we require a greater than 60% estimated chance of nominating and electing a minority-preferred candidate. We chose this figure in view of the above considerations, and because we found that districts with $s > .6$ in any one of our three scores were quite likely to have $s > .5$ in the other two versions, increasing our confidence

---

[21]Namely, our group-control factor for a district is $c = \min(2k, 1)$ where k is the group's share of CVAP. Alternatively, the modeler could set an election-specific group-control factor in several reasonable ways: as the minority group's estimated share of votes for the candidate of choice; the group's estimated share of the district's Democratic primary electorate; or the estimated group votes for the minority-preferred candidate divided by the total votes for all candidates, for example.

[22]We tune logit curves $f(x) = 1/(1 + \exp(-(ax + b)))$ so that $f(0) \geq 0$, $f(1) \leq 1$, and $f(c \cdot s_i) \approx \delta_i$ where s_i are the raw effectiveness scores of enacted districts, c is group control, and $\delta_i \in \{0, 1\}$ are the ground-truth outcomes (with 1 for success) for the corresponding candidates of choice. The aim is to input a raw effectiveness score s and a group-control factor c and update s to a probability of effectiveness $f(cs)$. For details and examples, see Supplementary Appendix B.

that the districts selected in this way are likely to perform more often than not.[23]

4.6. *Assembling the ingredients to build a VRA-conscious ensemble*

Running on a standard laptop, ReCom generates new plans at a pace of hundreds of plans per minute in the Python implementation in (MGGG Redistricting Lab 2018b), and runs about 40 times faster in the Julia implementation in (MGGG Redistricting Lab 2020b), depending on the size of the districting problem and the tightness of the constraints.[24] The VRA-conscious protocol implemented here in Python (MGGG Redistricting Lab 2020a) reassesses district effectiveness scores at each step, which slows the process somewhat, so that our runs take about 35 steps per minute for the unweighted and statewide scores and about 15 steps per minute for the district-level score on a state the size of Texas. For a smaller state like Louisiana, the speed more than doubles.

The last question to specify our protocol is how to set the numbers of effective districts that a proposed map must contain for each minority group, to be presumptively valid under the VRA and the Constitution, and thus to be included in our ensemble. Our first guide in answering this question is the state's most recent districting plan, which may have been in effect for up to a decade and either has gone unchallenged in court or has withstood legal challenges, including VRA claims.[25] The second guide, discussed above, is *rough proportionality*, within the meaning of the Supreme Court's important VRA decisions in *Gingles* and *De Grandy*: plans are frequently judged by whether the share of effective districts is similar to each group's share of statewide CVAP.

Considering these guides, we will reject proposed plans that have fewer minority-effective districts than the benchmark plan; in other words, we will treat this threshold level of effectiveness as a *validity check* in the district-generation algorithm. For instance, if we are considering a single minority group and the benchmark plan has three districts that are effective for that group, then each plan included in the ensemble must have at least three effective districts as well. On the other hand, we would reject a proposed plan if it had so many effective districts for one minority group that it would relegate another sizable demographic group to substantially sub-proportional representation.

Surveying the protocol described in this section, the key to our approach is its close reliance on detailed, precinct-level election results from both primary and general elections. We do not assume that some *a priori* demographic threshold will cleave districts that provide minority voters with realistic electoral opportunities from districts that will not. The approach is deeply empirical, focusing on whether a specific district, regardless of its precise demographic percentages, has a recent history of consistently supporting minority-preferred candidates in both primary and general elections. To quote Justice Kagan, our protocol is "evidence-based, data-based, statistics-based. Knowledge-based, one might say" (*Rucho* v. *Common Cause* 2019, 2519 (Kagan, J., dissenting)).

5. CASE STUDY: CONGRESSIONAL DISTRICTING IN TEXAS

We applied the VRA-conscious protocol described in section 4 of this article to build 36-district Texas congressional plans.

5.1. *Data*

We downloaded the 2018 Texas precinct shapefile and statewide election returns from the Texas Legislative Council's website (Texas Legislative Council 2020). Table 2 shows summaries of the demographic data obtained from the 2010 decennial census and the ACS rolling average for the five-year span

---

[23]Case law does not dictate how certain we must be of district effectiveness. When analyzing Texas districts, we found that rejection sampling for effectiveness ran as efficiently at the $s > .7$ threshold as it did at $s > .6$, suggesting that a modeler could exercise considerable discretion in setting the effectiveness threshold.

[24]To be more precise, we conducted non-VRA trial runs on Texas, Virginia, and Pennsylvania congressional plans built out of precincts using identical machines (Intel(R) Xeon(R) CPU E5-2660 v2 @ 2.20GHz [Ivy Bridge, late 2013]), allowing districts to deviate from ideal population by only 1%. Over runs of various lengths and with various seeds, the Python implementation generated three to eight valid plans per second, while the Julia implementation generated 120 to 320 valid plans per second.

[25]Numbers derived from this benchmark may need to be adjusted if the state's political geography or demographics or the number of districts in a state's plan has changed (for example, due to reapportionment of congressional seats). Our protocol can be run using a different map as a benchmark if there is reason to believe the current plan violates the VRA or the Constitution.

TABLE 2. TEXAS DEMOGRAPHICS

Racial group	*Share of total population*	*Share of VAP*	*Share of CVAP*
Latino	37.62%	33.61%	29.36%
Black	11.48%	11.36%	13.08%
White	45.33%	49.64%	52.28%
Other	5.57%	5.39%	5.28%
Total count	*25,145,561*	*18,279,737*	*17,858,066*

Latino, Black, White, and Other shares of Texas residents by total population, voting-age population (VAP), and citizen voting-age population (CVAP). Total population and VAP data are taken from the 2010 decennial census, while CVAP data comes from the American Community Survey (ACS) five-year rolling average ending in 2018.

ending in 2018. (We used CVAP from ACS five-year spans ending 2016, 2014, and 2012 when assessing elections from those years.) While election data could be directly joined to the shapefile, we used the maup package to disaggregate ACS data from block groups (the smallest unit for which CVAP is available) down to census blocks and then aggregated the block-level data up to precincts (MGGG Redistricting Lab 2018c). Total population and VAP were collected from the 2010 decennial census; and because these data are available at the block level, they required no proration and could be directly aggregated up to the precinct level.

We then analyzed 21 statewide Texas elections conducted from 2012 to 2018, which are recorded in Table 3. These were all the statewide elections conducted since the last round of redistricting almost a decade ago—for federal and state offices, both executive and legislative, omitting only state judicial elections.

Ultimately, we eliminated from consideration seven of those 21 elections (struck through in the table) because there was no contest in the Democratic primary, which in Texas is a critically important stage of the electoral process for determining which candidates are minority-preferred. We were left with 14 contests: nine primary/general sets and five primary/runoff/general sets, where the runoff was conducted because no candidate garnered an outright majority of the vote in the Democratic primary.

TABLE 3. THE 14 ELECTION SETS IN THE TEXAS DATA

	2012	*2014*	*2016*	*2018*
President	P/G		P/G	
U.S. Senator	P/R/G	P/R/G		P/G
Governor		P/G		P/R/G
Lieutenant Governor		~~G~~		P/G
Attorney General		~~G~~		~~G~~
Comptroller		~~G~~		P/G
Land Commissioner		~~G~~		P/G
Ag. Commissioner		P/R/G		~~G~~
RR Commissioner	~~G~~	P/G	P/R/G	P/G

The 14 election sets in our Texas data (5 of which included a primary runoff), and the 7 general elections that we omitted because the Democratic nominee lacked any primary opposition. P means Democratic primary; R means Democratic primary runoff; and G means general election.

We also compiled district-level data for the 36 U.S. House, 31 Texas Senate, and 150 Texas House of Representatives seats, including the race and party of the winning candidates in all elections from 2012 to 2018, as well as demographic data for the districts, for use in the score calibration described in section 4.4 and carried out in section 5.3 (History, Art, and Archives, U.S. House of Representatives, Office of the Historian, 2020a, 2020b).[26]

5.2. *Racial polarization and candidates of choice*

The statewide results for general elections in Texas show a stark pattern of racial polarization. Across 14 separate contests in four election cycles, all three minority groups consistently voted Democratic, and white voters consistently voted Republican, as shown in Figure 3. In Texas, it is commonplace for more than three-quarters of white voters to vote Republican and more than three-quarters of minority voters to vote Democratic in the same election. Furthermore, this basic pattern appears to hold, to a greater or lesser degree, in every region of the state.

It therefore is not surprising that the great majority of Texas's non-white officeholders are Democrats. From 2012 through 2018, there were only two exceptions for Representatives in Congress (out of 15 Latino or Black members) and eight exceptions for Texas state Senators or Representatives (out of 83 Latino or Black state legislators).

No Democratic candidate has won a statewide general election in Texas since 1994. So none of the Latino- or Black-preferred candidates in our 14 recent contests prevailed statewide. But the vote patterns show that each of them carried a significant number of *districts* in general elections under the current Texas congressional plan and under every plan in our ensembles.

Just as the Latino-preferred and Black-preferred candidates in all 14 statewide elections were Democrats (see Figure 3), the same has held true in

[26]See also Carl Klarner. 2019. "Racial Identification of State Legislators 2001–2019." Unpublished data set. Purchased from <http://klarnerpolitics.org/>.

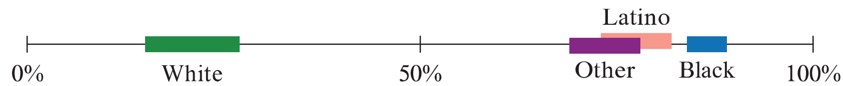


FIG. 3. The highest and lowest EI point estimates for each racial group's support of the 14 Democratic nominees in statewide general elections: White (15–27%), Other (69–78%), Latino (73–82%), and Black (84–89%).

congressional elections. The success of Latino- and Black-preferred congressional candidates in Texas therefore has hinged on their ability to win Democratic primaries (and, where applicable, primary runoffs) and then win general elections. A large majority of white voters in Texas primary elections participate in the Republican primary, while most people of color who participate in Texas primaries vote in the Democratic primary. So, for VRA purposes, we can currently forgo analysis of voting patterns in Republican primaries or Republican primary runoffs in Texas.

In Democratic primaries and primary runoffs, we found a high degree of cohesion across demographic groups. Because all 14 contests were for single-member offices (like governor), we focused on the one candidate in each Democratic primary who was preferred by each of the four demographic groups. In nine of the 14 Democratic primaries and in four of the five Democratic primary runoffs, the three minority groups (Latino, Black, Other) preferred the same candidate, as shown in Supplementary Appendix Table 7.

Given this cohesion in Democratic primaries and runoffs and especially in general elections, it might well be possible to treat Latino and Black voters, or Latino/Black/Other, as a single coalition group for

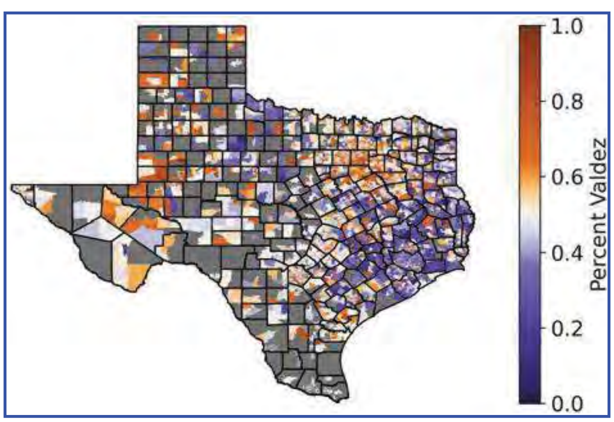


FIG. 4. The distribution of EI-estimated Black support for former Dallas County Sheriff Lupe Valdez in the 2018 gubernatorial runoff. The Dallas-Fort Worth area, in northeastern Texas, is mostly *orange* in this map, while the Houston area, in southeastern Texas, is mostly *purple.* (The map's *gray areas* contain few, if any, Black voters.) This map shows that even statewide EI can find significant regional variation in a group's voter preferences.

VRA purposes (*Campos* v. *City of Baytown*, 1988, 1244–45). Our main analysis will treat Latino and Black voters as separate minority groups, but the same method could be adapted (and indeed simplified) for coalitional analysis.

As a final and important point relating to our EI setup, we note that we do not need to run EI on small geographies to detect regional difference.

For example, in the 2018 gubernatorial runoff, former Dallas County Sheriff Lupe Valdez and Houston's Andrew White are identified as the statewide candidates of choice for Latino voters and Black voters, respectively. But in the Dallas-Fort Worth Metroplex, Valdez carried both minority groups. As Figure 4 shows, that effect is visible in our EI outputs from a statewide run, because the hierarchical model works by computing distributions of support on each precinct. This lets us identify Valdez as the Black-preferred candidate in the Dallas-Fort Worth Metroplex while White is seen to have carried the Black vote in the Houston area.

5.3. *Effectiveness scores and inclusion criteria*

In Texas, we have the benefit of seeing results from 33 separate contests (14 primaries, 5 primary runoffs, and 14 generals), so that 14 potential successes make up the raw effectiveness score.[27]

According to recent CVAP data (shown in Table 2 above), rough proportionality would require 10.6 districts and 4.7 districts that are effective for Latino voters and Black voters, respectively, given Texas's current congressional apportionment of 36 seats. We will round these to 11 and 5 districts, respectively. If Latino, Black, and Other voters were treated as a coalition, that coalition's proportional share would exceed 17 districts.

Using any of our three calibrated scores, Texas currently has 11 effective districts for minority groups at the 60% threshold: seven Latino-effective districts,

[27]To perform the logit calibration step described in section 4.4, we used all congressional and state-legislative winners from 2012 to 2018. This includes 145 congressional contests (36 districts), 600 state House contests (150 districts), and 77 state Senate contests (31 districts), for a total of 822 data points. This includes one special election for Congress.

TABLE 4. STATISTICS FOR EFFECTIVE DISTRICTS IN CURRENT TEXAS CONGRESSIONAL PLAN

CD	Location	HCVAP %	Latino effective s^{unw}	Latino effective s^{state}	Latino effective s^{dist}	BCVAP %	Black effective s^{unw}	Black effective s^{state}	Black effective s^{dist}	WCVAP %	Representative	Race
9	Houston	24.7	44	38	43	46.7	96	96	94	16.1	Al Green	Black
15	South Texas	73.7	95	97	97	2.5	8	9	7	22.1	Vicente Gonzalez	Latino
16	El Paso	76.0	99	99	97	4.2	11	12	10	17.5	Veronica Escobar	Latino
18	Houston	26.9	51	44	51	44.9	95	95	95	22.8	Sheila Jackson Lee	Black
20	San Antonio	65.0	97	97	97	5.6	12	12	12	25.8	Joaquin Castro	Latino
28	South Texas	69.2	86	93	96	5.5	10	12	8	23.2	Henry Cuellar	Latino
29	Houston	64.0	98	97	97	16.2	49	48	46	16.7	Sylvia R. Garcia	Latino
30	DFW	22.7	44	38	39	52.1	99+	99+	99	21.7	Eddie Bernice Johnson	Black
33	DFW	46.5	98	98	95	24.1	78	75	64	25.6	Marc A. Veasey	Black
34	South Texas	78.5	98	99	93	1.6	8	9	6	19.1	Filemon B. Vela	Latino
35	Austin/San Antonio	52.2	97	97	97	10.3	22	20	24	34.4	Lloyd Doggett	White

The population shares and calibrated effectiveness scores for the 11 districts in the current Texas congressional map that are labeled effective for Latino and/or Black voters. Scores over 60% have darker shading, and scores in the 50–60% range have lighter shading. Mark Veasey's District 33 is the only one that registers as effective for both Latino and Black voters, though Sheila Jackson Lee's District 18 and Sylvia Garcia's District 29 are close. All 11 Representatives are Democrats.

three Black-effective districts, and one district that is effective for both groups (see Table 4). If our protocol focused solely on the most recent elections (e.g., 2018), however, two additional districts—District 7, currently represented by Lizzie Fletcher, a white Democrat, and District 32, currently represented by Colin Allred, a Black Democrat—might meet the effectiveness thresholds for Latino voters or Black voters under some or all of our three calibrated scores. But in the early years of the decade (e.g., 2012 and 2014) both districts were still reliably voting for Republicans in statewide and congressional elections.

Since the current map has withstood judicial scrutiny under both the VRA and the Equal Protection Clause (*Abbott* v. *Perez* 2018, 2324–34), we require plans in our VRA-conscious ensemble to meet or exceed that map's level of effectiveness: so we require at least eight Latino-effective districts, at least four Black-effective districts, and a total of at least 11 districts that are effective for at least one of the groups. So, for example, a plan whose (Latino, Black, Both, Neither) effective-district count was (4, 0, 4, 28) would not qualify for the ensemble because it falls short of 11 minority-effective districts. In effect, this approach allows plans whose effective-district counts are (7, 3, 1, 25) or (8, 4, 0, 24), as well as plans that dominate one of those outcomes from the minority perspective by shifting districts from Neither to any of the other categories.[28]

5.4. *Basic results*

In this section we first present evidence to support the claim that our chains of districting plans have produced VRA-conscious ensembles whose statistics have stabilized after 100,000 steps. We then look at how the statistics from these ensembles compare to an ensemble built with no consideration of race and to an ensemble generated with demographic thresholds as a potential stand-in for VRA compliance. Put differently, we compare ensembles generated by our VRA-conscious protocol, which uses both racial and electoral data, with an ensemble built with racial but not electoral data and an ensemble built with neither racial nor electoral data.

We built five ReCom ensembles, by running each of the following kinds of chain until 100,000 maps are accepted.

(non-VRA) *No VRA consideration.* Only population equality is an explicit validity check, since contiguity is required and compactness is weighted into ReCom ensembles by construction, so the algorithm does not have to be manipulated to produce reasonably compact districts.

(unw) *Constrained by s^{unw} effectiveness.* Ensemble inclusion additionally requires at least eight districts over 60% Latino-effective, at least four districts over 60% Black-effective, and at least 11 total districts effective for one or both groups, using unweighted effectiveness scores.

(state) *Constrained by s^{state} effectiveness.* Same as above, but using statewide weighted scores.

[28]Although a map with fewer than 18 Neither districts could potentially give rise to a Section 2 claim by white plaintiffs and thus merit exclusion from an ensemble, our chain runs did not generate any such plan.

(dist) *Constrained by s^{dist} effectiveness.* Same as above, but using district weighted scores.

(CVAP) *Constrained by CVAP shares.* A plan must have at least eight districts over 45% HCVAP and at least four districts over 25% BCVAP to pass the validity check.[29]

5.4.1. Convergence heuristics and robustness checks. Neither ReCom nor any other MCMC method will work properly if it is not allowed to run long enough, or if designed in a way that thwarts convergence. In this article we have used ensembles built by including every plan that passes the validity checks and continuing until 500,000 maps are collected. We used two kinds of evidence to arrive at the conclusion that 500,000 plans are probably sufficient: first, we have confirmed that chains of that length have aggregate statistical properties that are approximately independent of their starting points, or "seeds," even when the seeds are quite different. This test is sometimes called the *multistart heuristic*. Second, for selected instances we have confirmed that an ensemble ten times as large has similar aggregate statistics. Passing these tests is not a rigorous proof of approximately representative sampling, but these are standard convergence heuristics used across applied statistics. If any ensemble method fails these tests, we can be sure that either the setup violates the conditions for a unique steady state, or we have not run the chain long enough to approach it.

For the multistart heuristic to have high value, we should choose plans that are initially very different and check to see that the ensembles converge to find the same summary statistics nevertheless. The first seed plan used for the multistart test for this Texas case study is the enacted congressional plan that is currently in effect, which came out of the court proceedings challenging the early-decade plan of the Republican legislature. To find two other seeds with exaggerated differences from the enacted plan, we turned to the Atlas of Redistricting project conducted by the politics team at FiveThirtyEight (Bycoffe et al. 2018). Seed 2 is their Texas plan drawn to favor Democrats, which is visibly quite different from the enacted plan and of course has very different partisan properties as well. Seed 3 is based on the plan FiveThirtyEight drew with an eye to compactness scores and county integrity.[30]

For the ensemble using the statewide effectiveness score, Figure 5 shows that a simple partisan statistic—the Clinton share of the major-party presidential vote from November 2016 across the 36 districts—gives roughly the same answers after 100,000 steps, whether the chain commences with the enacted plan or with either of the two other seed plans. Similar charts for s^{unw} and s^{dist} are found in Supplementary Appendix Figure 17. These are boxplots (or "box-and-whiskers plots") where for each plan the districts have been sorted from 1 (the district with the lowest Clinton share) to 36 (highest Clinton share). The boxes show the values at the 25th to 75th percentiles, with the median marked, and the whiskers are set at the 1st and 99th percentiles. Colored circles show the initial values for the enacted congressional plan (red) and the two additional seed plans (blue and green). The aggregate data collected from the three differently initialized runs is broadly consonant: across the districts, the three ensembles have medians, quartiles, and overall ranges within one or two percentage points of each other, even when the seeds began over 15 points apart. By contrast, Figure 6 focuses on the 18 districts with the highest Clinton share to show that our VRA-conscious ensembles, by any of the three scores, do perform differently than if a user either ignored the VRA entirely or used the CVAP demographic constraint as a VRA proxy.

We can also compare spatialized statistics such as the one shown in Figure 7, a record of the number of times that each precinct appeared in a district with $s^{\text{state}} > .6$. Just 1,000 steps from the starting point, the heatmaps are visibly different, showing that the chain has not run long enough for this statistic to converge. Much nearer visual correspondence is achieved after 10,000 steps, and the heatmaps are nearly indistinguishable after 100,000 steps.

Beyond the multistart trials, we also checked the same statistics (Clinton vote distribution and cut-edges score) after 1 million steps. We found

[29]To build a demographic-target ensemble, we searched for maps with at least eight majority-Latino districts and at least four majority-Black districts by CVAP. Initial attempts did not produce any such maps. We then lowered the thresholds to 45% for Latino CVAP and 25% for Black CVAP. While those thresholds are somewhat arbitrary, they roughly track Table 4, as well as the results of section 6 shown in Figure 9.

[30]The FiveThirtyEight compact plan did not initially meet our VRA effectiveness requirements, so we used a heuristic-optimization run as in Supplementary Appendix H to get it past the thresholds. Both FiveThirtyEight plans had to be transferred onto our precinct units with the maup package (MGGG Redistricting Lab, 2018c).

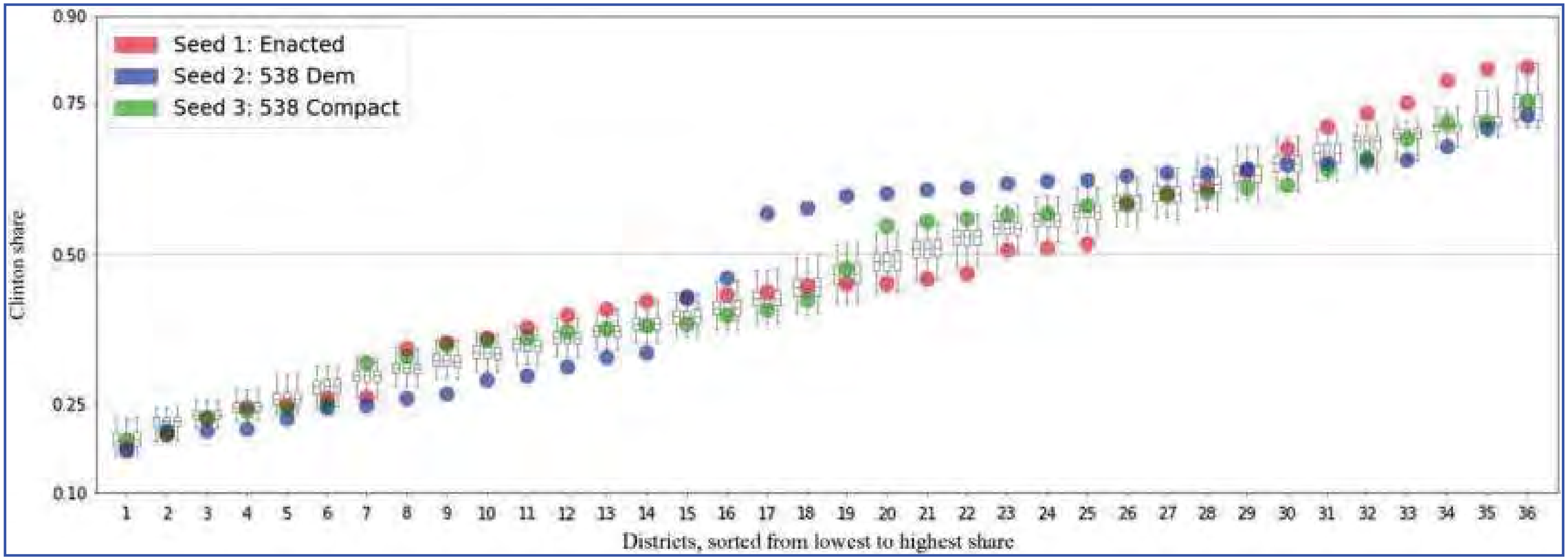


FIG. 5. In this multistart heuristic convergence test, the VRA-conscious chain for the statewide weighted effectiveness score s^{state} is run for 500,000 steps from three very different starting points. The colored dots show the Clinton share of the major-party vote from the 2016 presidential general election, district by district, in the three seed plans described in the text (with the districts sorted from lowest Clinton share to highest). The *boxes and whiskers* show Clinton share by district for each of the three ensembles—they have converged to within one or two percentage points in each district, even though the seed plans sometimes differ by 15 points or more.

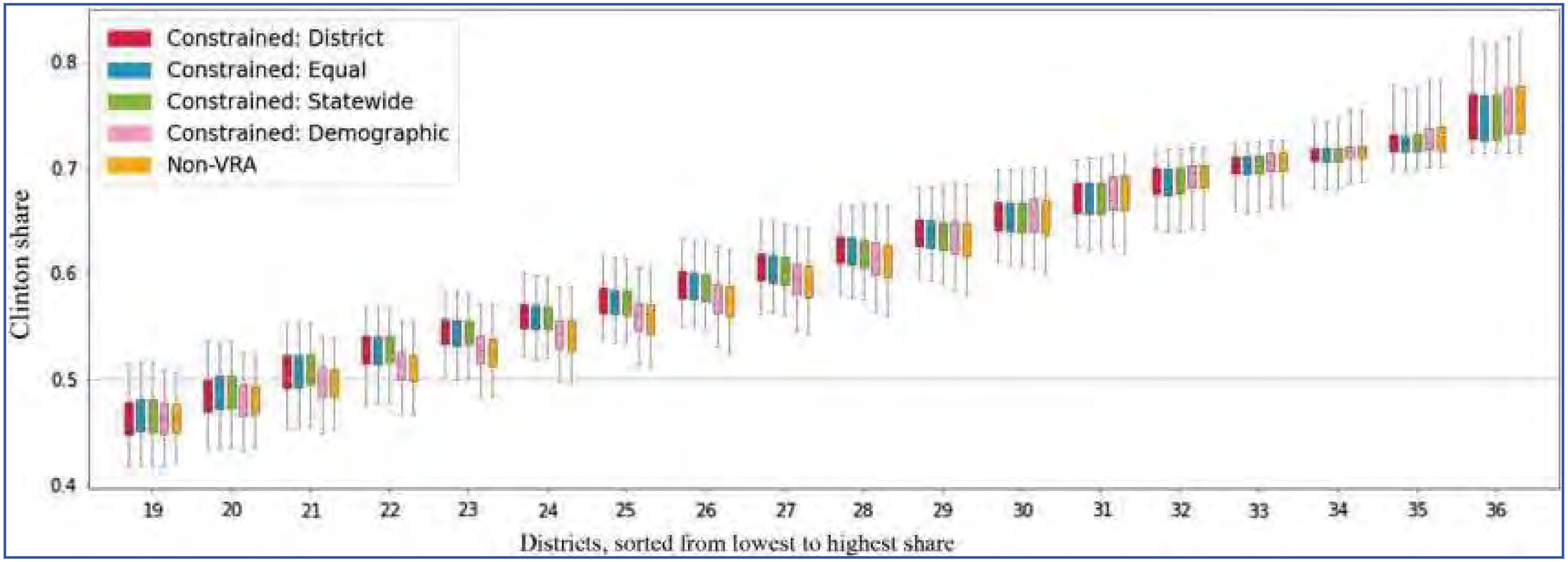


FIG. 6. Comparing the three kinds of VRA-conscious ensembles, constrained by the s^{dist}, s^{unw}, s^{state} scores, respectively, to the alternatives described in the text. Here, the Clinton share is plotted across 500,000 steps and displayed for the 18 most Democratic districts. There is a small but discernible difference that separates the partisan statistics of the VRA-conscious ensembles from those of the control ensembles, which are interestingly similar.

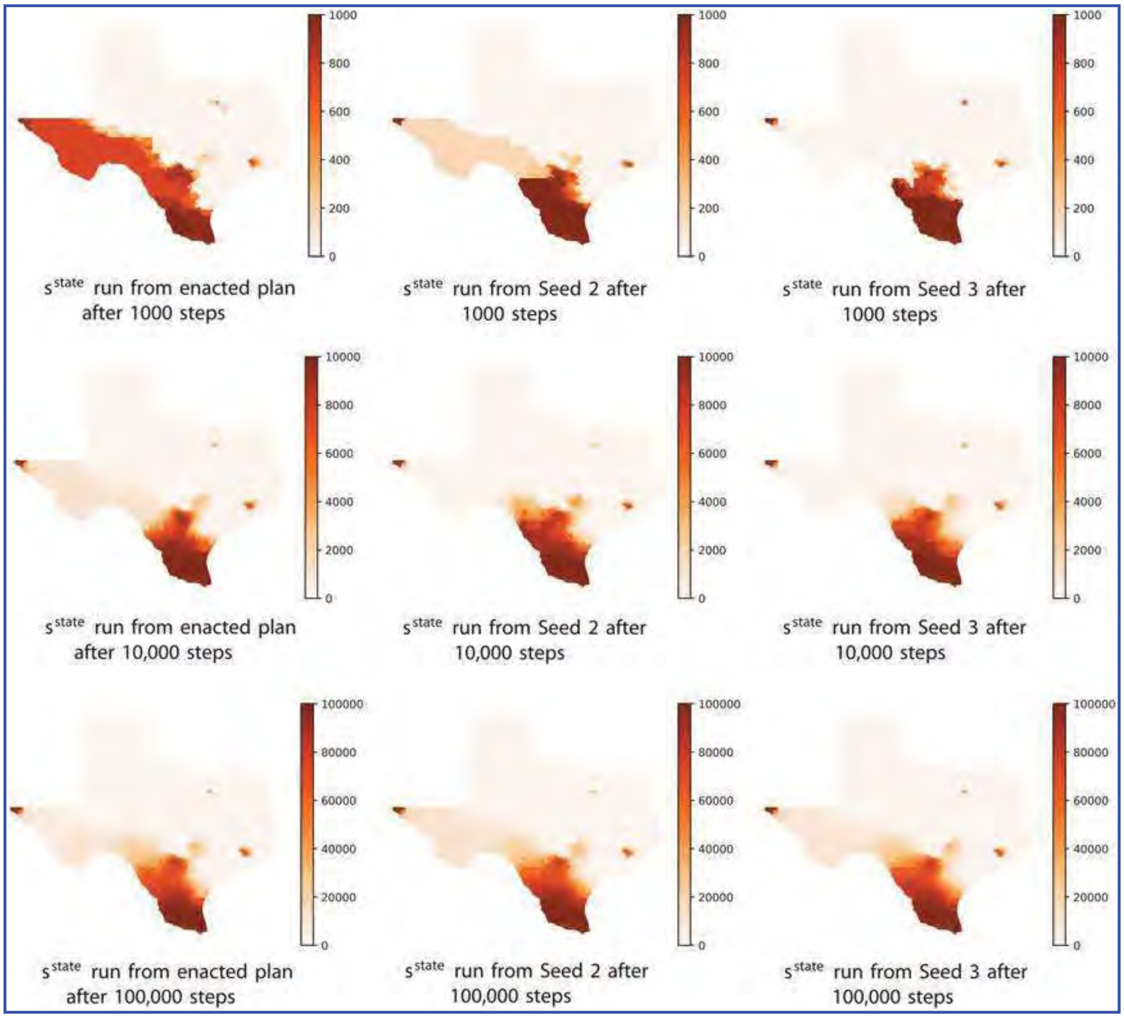


FIG. 7. The *color* of each precinct shows how many times it had appeared in a Latino-effective district after 1,000, 10,000, and 100,000 steps. These VRA-conscious ensembles are drawn with respect to the s^{state} score from the same three seed maps described in the text. There are initially significant differences across the three seeds (*top row*), but the plots converge over the course of the run (*bottom row*).

minimal difference in partisan or district-shape metrics when comparing the initial 100,000 steps, a sub-sampled 100,000-plan ensemble containing every tenth map from the set of 1 million, or the full million-plan ensemble. This raises our confidence both that the size of the sample is adequate to this level of statistical detail and that a run length in the hundreds of thousands is sufficient for convergence. Finally, we conducted slightly altered runs to confirm whether the general findings are robust to reasonable perturbations in the methodology laid out in sections 4.3, 4.4, and 4.5.[31]

[31]We conducted the following tests: using estimated share of candidate support rather than CVAP share of the district as the group-control factor c; replacing the confidence term for correctly identifying candidates of choice $C(p)$ with the simpler term p; and dropping both the group-control factor and the calibration entirely. For the alternative group-control measure, the changes to scores on Texas congressional plans were minor for both the enacted plan and generated plans. Changes also were typically small with the simplified confidence factor, but the scores became more unstable because outcomes with high EI-based uncertainty had more weight relative to clear outcomes, producing an illusion of greater electoral success on some reruns of EI. The logit calibration was valuable largely to correct for the reduction of scores by group control; we find that if we drop both of them, districts with significant shares of both Latino and Black voters are rated higher for both groups than recent electoral history warrants. Finally, we confirmed that the rate of ensemble generation is similar whether the effectiveness threshold is set at 60%, 70%, or even 75%. Taken together, these robustness runs increase our confidence that each of these parameters that requires user choice is indeed doing work in constructing a stable score that comports with electoral history, but that some of the details could be altered without breaking the protocol.

5.4.2. Comparing ensembles. In this section we compare the five ensembles defined in section 5.4 to each other, considering whether those created using our VRA-conscious protocol differ significantly from those created without electoral data or without both electoral and racial data. The answer is a definitive yes. We have already seen that the three effectiveness scores are similar to each other for the enacted plan's minority-effective districts (Table 4). Using summary statistics, we can confirm that the constrained ensembles using the three scores are similar to each other as well. But the three VRA-conscious ensembles do not resemble either the non-VRA ensemble (which uses neither electoral nor racial data) or the CVAP-shares ensemble (which uses racial, but not electoral, data as a purported stand-in for VRA compliance).

The upshot of rejecting plans with not enough effective districts is seen in Figure 8 with respect to the s^{state} score: no plan in the ensemble has fewer than eight Latino-effective or fewer than four Black-effective districts. This number of effective districts rarely happens by chance without a VRA-conscious method. Interestingly, enforcing the demographic threshold condition (bottom row) makes it somewhat more common to get at least four Black-effective districts but does not make an appreciable difference in the likelihood of creating an eighth Latino-effective district. (Supplementary Appendix F contains analogous plots for the s^{dist} and s^{unw} scores.)

Table 5 is another view of the comparison. A significant share of the plans in all the VRA-conscious ensembles pass the demographic test set forth above, but relatively few plans in the non-VRA and the

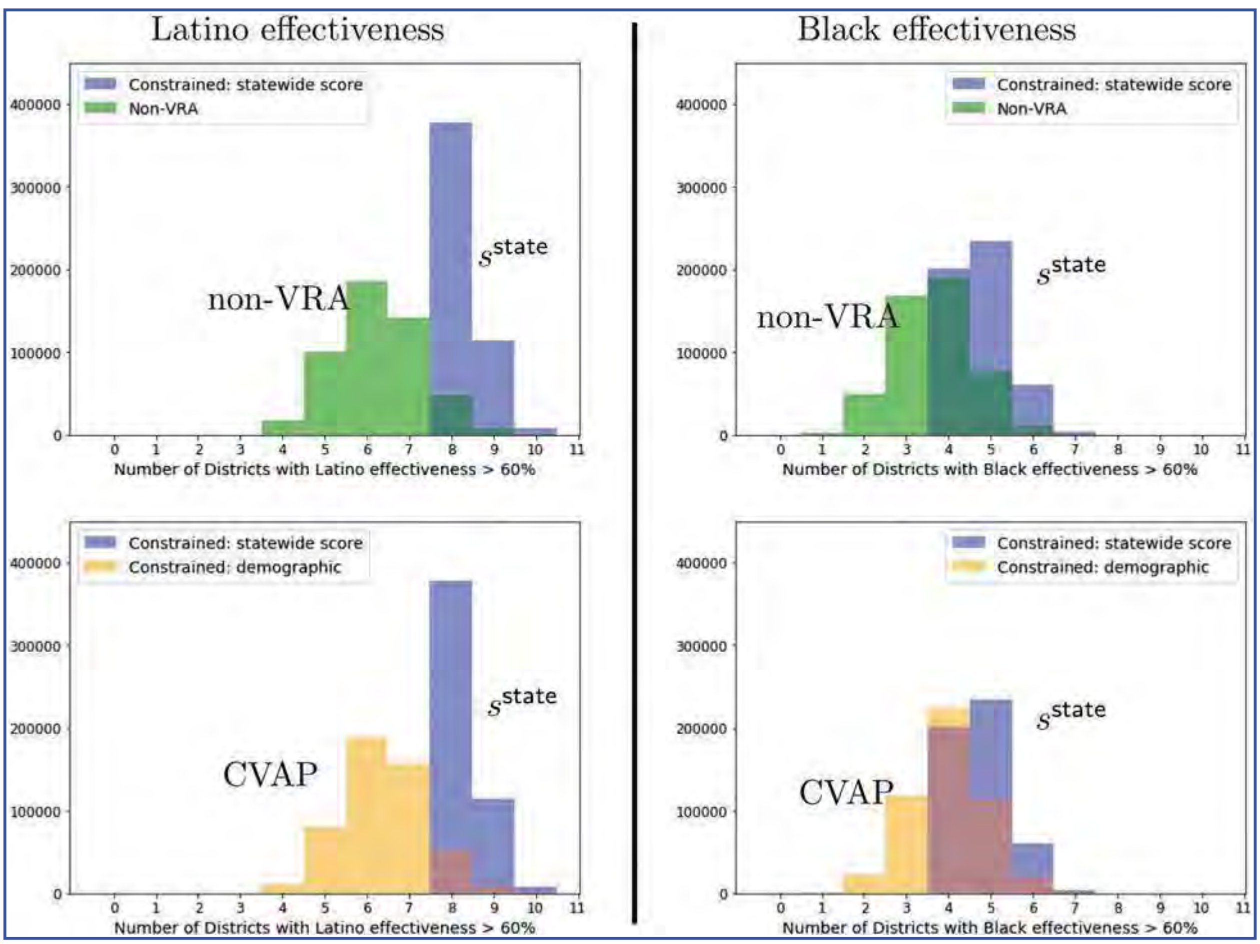


FIG. 8. The distribution of Latino- and Black-effective districts in a VRA-conscious ensemble (*purple*), compared to the non-VRA alternative (*top*, in *green*) and the CVAP-shares, demographics-based alternative (*bottom*, in *orange*). All are shown with respect to the s^{state} score. Note the very modest improvement in effectiveness for the CVAP-shares ensemble compared to the non-VRA ensemble.

TABLE 5. THE SHARE OF MAPS IN THE FIVE ENSEMBLES (COLUMNS) SATISFYING VARIOUS CRITERIA (ROWS)

		Unconstrained (non-VRA)	*Constrained*			*Constrained (CVAP)*
			(s^{unw})	(s^{state})	(s^{dist})	
Satisfies	(s^{unw})	15%	(100%)	88%	81%	20%
effectiveness	(s^{state})	20%	98%	(100%)	94%	26%
criteria	(s^{dist})	16%	72%	78%	(100%)	22%
Satisfies demographic criteria		30%	39%	46%	51%	(100%)

For the effectiveness criteria, maps must have at least eight Latino-effective districts (effectiveness over 50% for the indicated score), at least four Black-effective districts, and at least 11 distinct districts that are effective (for one or both groups) overall. Note that each VRA-conscious variant is built to satisfy effectiveness in a chosen score at the 60% level, making it likely to pass at least 11 district effectiveness tests for the other scores at the 50% level, since the scores are similar but not identical. The demographic test in the bottom row requires a map to have at least eight districts over 45% HCVAP and at least four districts over 25% BCVAP.

CVAP-shares ensembles pass our effectiveness tests.[32] This suggests that Texas ensembles built without rich electoral data—or by imposing a racial threshold—are unlikely to reflect VRA compliance and might well contain far too many maps that violate federal law. And this problem likely cannot be cured simply by changing the threshold levels for the CVAP-shares ensemble: if the CVAP thresholds are raised, it will become harder to find plans with enough qualifying districts, and many effective districts will be missed.

Comparing the three score-based ensembles against each other shows some differences but also substantial alignment in the determinations of validity. We should not be surprised that scores that typically track each other within a few percentage points can fall on the other side of a bright-line threshold: if s^{unw} is just over .6, it can certainly happen that s^{dist} is just below that level. But most districts for which one score is over .6 have the other scores over .5, making them more likely than not to be effective for the group in question. This standard is met by more than three-quarters of the s^{state} and s^{dist} ensembles. (Again, this is part of the justification to set the effectiveness threshold for ensemble inclusion at a level buffered safely above 50%.)

Considering all the evidence so far, one might ask whether any of the three calibrated effectiveness scores is to be preferred to the other two. Our determination is that all three scores can be useful. The unweighted score has the weakest claim of the three, because on its face it omits factors that are legally and factually relevant. As for the other two scores, we think it can be valuable to consider both. The district-weighted score has more regional discernment and a more sophisticated incorporation of EI outputs; the statewide-weighted score has a simpler explanation and still takes uncertainty into account. While results for different scores are not identical, the modeling methodology is robust across three reasonable ways of weighting elections to measure district effectiveness.

6. LEARNING PATTERNS IN DISTRICT EFFECTIVENESS

We have just seen that Texas congressional ensembles using demographic data but no electoral data do not resemble ensembles generated by our VRA-conscious, heavily data-driven protocol. But what about a method that uses both demographics and electoral data but in a limited way, needing only a smaller and simpler dataset? Often, scores that seem to be complicated by taking many things into account can be closely replicated using simpler inputs. In our setting, we would like to see whether our seemingly sophisticated handling of dozens of election contests could be well approximated by pared-down district metrics. To examine this question, we now model the nonlinear relationship between effectiveness scores and lower-dimensional combinations of demographic and partisan features.

In statistics and machine learning, numerous techniques have been developed to recognize patterns in data. *Classifier* models use training data to "learn" discrete labels (like yes/no effectiveness), while *regression* models "learn" continuous-

[32]That only about half the maps in the three VRA-conscious ensembles satisfy the demographic criteria implies that it is not uncommon in Texas for Latino-effective districts to have less than 45% HCVAP or for Black-effective districts to have less than 25% BCVAP. That fact in turn suggests that, at least in some parts of the state, there is significant coalitional voting between different minority groups.

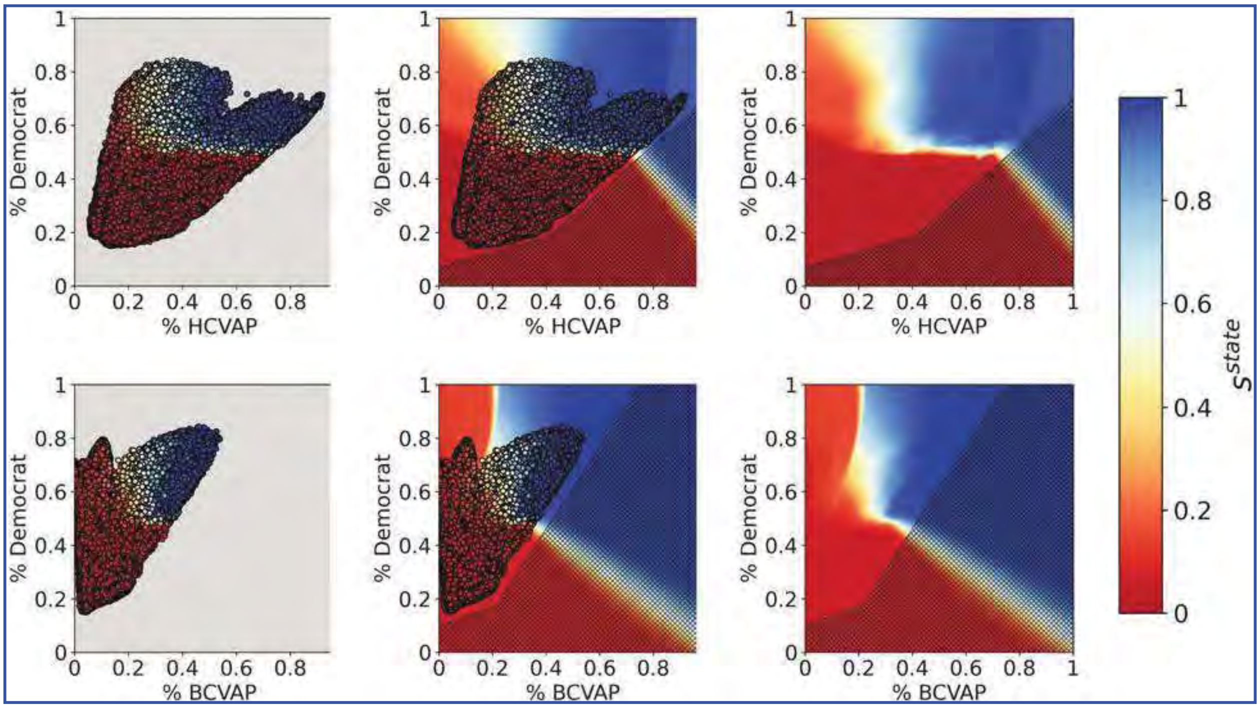


FIG. 9. The *top row* refers to effectiveness for Latino voters and to Latino CVAP; the *bottom row* to corresponding statistics for Black voters. Two-dimensional scatterplots (*left column*) show a collection of districts drawn from a non-VRA ensemble, arranged by Latino or Black CVAP share on the *x* axis and partisan lean on the *y* axis, then colored by their s^{state} score for Latino- or Black-effectiveness, respectively. The *k*-nearest-neighbors (KNN) method is "trained" on that data to infer approximate scores for all possible positions in the square (shown with the training data in the *center figures* and without it at *right*). The hatched areas in the *center and right-hand plots* contain no labeled data points, so the KNN estimates are less meaningful in those areas.

valued assignments (like effectiveness scores), on the basis of features in the data. For our examples, we are choosing to classify potential Texas congressional districts on the basis of two kinds of features:

- *Demographics*, using Latino and Black CVAP shares; and
- *Partisan lean*, obtained by averaging the Democratic shares of the 2016 and 2012 major-party presidential vote, with the more recent general election weighted twice as heavily as the older one.

We begin with a (non-VRA) ensemble of 500,000 plans, then extract the districts from each to make a large dataset, containing 997,163 districts after de-duplication. For each district, we compute its statewide weighted effectiveness score s^{state}. We randomly separate these districts into training data (80%) and data points held back for testing and validation (20%).

We attempted several kinds of models. A *k*-nearest neighbors (KNN) model assigns a value to each point based on the *k* points in the training data that are closest to its location. This can be thought of as a predicted effectiveness score for districts that may be proposed in the future. The choice of *k* is made by a validation step that attempts many different values and chooses the one that provides the highest accuracy.[33] For the regression, the learned value assigned to a point is the average value of its *k* nearest neighbors, while the yes/no classification is made by selecting the majority label among those neighbors.

The outcomes of two-dimensional KNN regression are shown in Figure 9. They show a complicated district-level relationship between effectiveness (color), Latino or Black CVAP shares (*x* axis), and partisan lean (*y* axis). If the effectiveness of districts could be captured with CVAP

[33]To be precise, we use *m*-fold cross-validation with $m = 10$, then choose the *k* for KNN with the best average r^2 and mean squared error (MSE) over those ten-fold trials. Using those values of *k*, the final accuracy estimates use the full set of training data and are then corroborated against the withheld testing data.

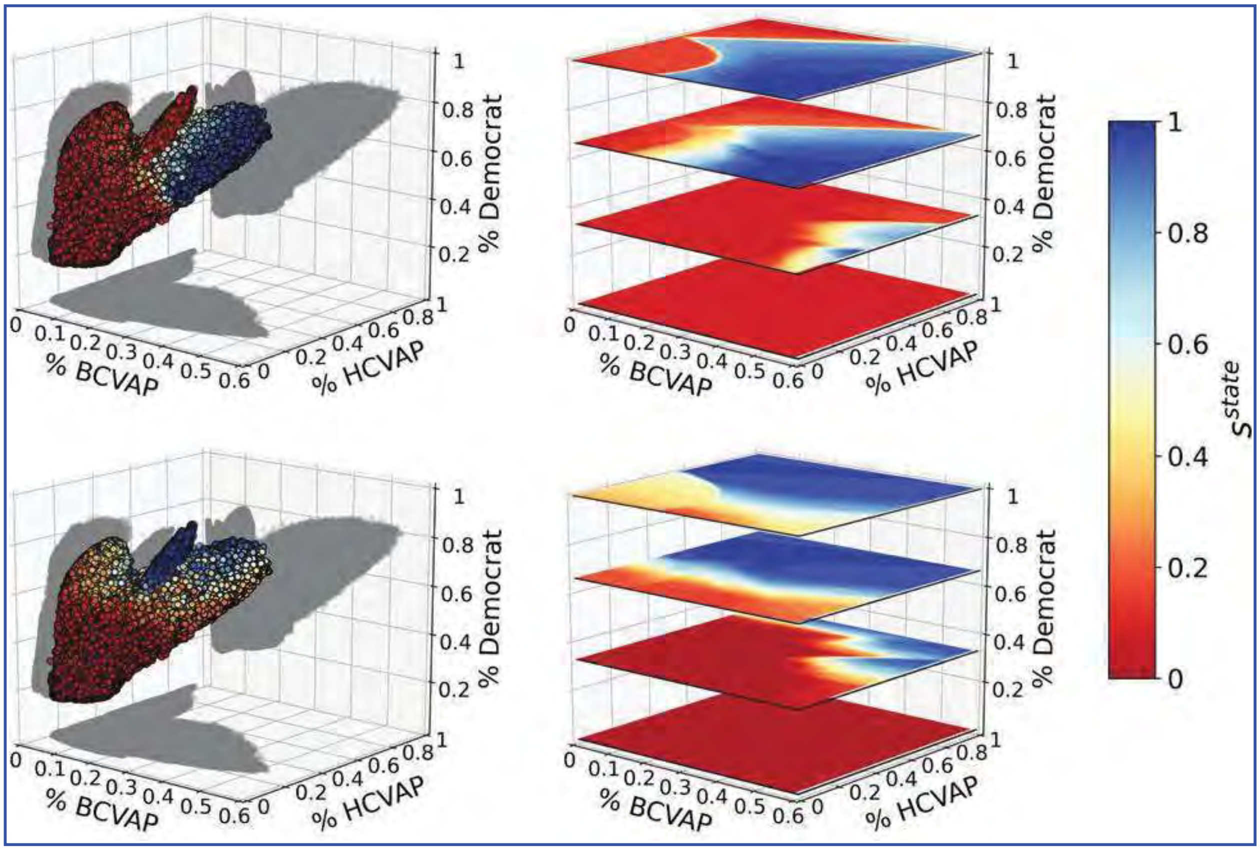


FIG. 10. KNN regression for a three-dimensional scatterplot of district effectiveness.

shares alone, we would see a vertical line dividing the effective (blue) from the ineffective (red) zones. If overall partisanship were a good predictor on its own, we might see a horizontal dividing line; this is not the case, but we note that partisanship alone is more predictive for Latino effectiveness. If effectiveness could be expressed in a simple linear relationship between partisan lean and CVAP, we would see a straight line of some slope separating the blue and red regions. Instead, we see a more complicated frontier with a large zone of ambiguity, especially in Latino effectiveness.[34]

Because Texas has two sizable minority groups, and Latino and Black voters often have overlapping electoral preferences, we might hope to do better by taking both groups' CVAP shares into account simultaneously. To this end, Figure 10 shows the same kind of regressions in three dimensions: Latino CVAP, Black CVAP, and the same measure of partisan lean. These plots still reveal complex, nonlinear frontiers and significant zones of ambiguity.

Further pattern-recognition results using various models for regression and classification are found in Supplementary Appendix G. Together, these methods indicate that scores built from our involved electoral methodology do not easily reduce to combinations of CVAP demographics and general-election partisan lean. This leads us to conclude that electoral complexity, perhaps especially the dynamics of actual primary elections, is playing an ineliminable role in our determination of district effectiveness.

7. CLOSING THE REPRESENTATION GAP

Finally, we return to where this article began: the underrepresentation of communities of color at both the federal and state level. The algorithmic techniques described in this article can be readily

[34]Grofman, Handley, and Lublin (2001) studied what amounts to effectiveness classification in a similar feature space nearly 20 years ago, positing an "elbow" or V-shaped frontier of effectiveness. For a comparison of our classification results with their framework, see Supplementary Appendix G.

reconfigured to point the way to maps that are likely to promote significant gains in minority representation.

7.1. *Searching for higher effectiveness*

Recall first that our VRA-conscious ensembles are made by imposing yes/no validity constraints rather than a probabilistic tilt or bias: the proposal of new plans is made without regard to race, and the validity criteria are given by a threshold test, with no preference for plans that exceed the threshold by a wider margin. It is therefore unsurprising that this procedure does not on its own favor the creation of plans that greatly surpass the status quo in minority electoral opportunities. But—so long as districts are population-balanced, contiguous, reasonably compact, and constructed largely or entirely from intact precincts, as is the case across all our ensembles—maps generating rough proportionality for all sizable minority groups might well be the ones that actually minimize legal exposure under both the VRA and the Equal Protection Clause.

By shifting to an algorithm that has a tilted acceptance function favoring increased minority electoral opportunities, we found it to be straightforward to create maps that fully meet (or even exceed) rough proportionality simultaneously for multiple minority groups. For example, in Texas we were able to create maps that are effective enough to typically meet rough proportionality simultaneously for both Latino and Black voters, while not sacrificing districts to double-counting—i.e., while achieving near-proportionality for people of color overall as well as for each group individually. A *heuristic optimization* algorithm can preferentially accept maps with higher minority effectiveness. We carried this out with the general "short bursts" strategy outlined in Cannon et al. 2020; for details, see Supplementary Appendix H.

To be clear: maps proposed for adoption should be developed through human deliberation based on significant community input and a broader range of criteria and values than our algorithm incorporates. No map plucked from an ensemble is likely to satisfy all human desiderata off the shelf. But just to demonstrate that a map with eight Latino-effective districts and four Black-effective districts can be replaced by one with (at least) ten and five such districts, respectively, we examine one demonstration plan found in a local search.

7.2. *A demonstration plan*

Our demonstration plan is depicted in Figure 11, and its effectiveness statistics by district are shown in Table 6.

We emphasize that this map is not intended to be an ideal map. But it does show that a carefully drawn plan could be dramatically fairer for historically underrepresented minority groups in Texas. We call it a "demonstration map" because it demonstrates that the shortfall of minority representation in the status quo map can be cured. The failure to do so can be attributed not to geography or law, but only to line-drawing.

In Table 6, we have *uncoupled* the primary and general elections, to give a more detailed view of the electoral history of these districts. In other words, this table shows the primary/runoff success independent of the general-election outcome, while our effectiveness-scoring system requires wins in both the primary (or primary and runoff) and the general, to be counted as a success. The table shows that, using any of the three scores, the demonstration plan contains at least 11, and perhaps as many as 13, effective districts for Latino voters and at least five, and perhaps as many as seven, effective districts for Black voters. Because one district in the Dallas area (District 33) and at least one in the Houston area (District 18) appear to be effective for both Black and Latino voters, the total number of minority-effective districts in the demonstration plan is 14, 15, or 16, depending on whether you rely on the unweighted, statewide, or district scores, respectively. Only one of the 16 districts is majority-white by CVAP.

Several of these 16 highlighted districts have demographics and effectiveness scores similar to those of the minority-effective districts in the current enacted plan (compare Table 4). However, in the current enacted plan, every district except Congressman Veasey's District 33 follows the rule that districts marked effective for Latino voters have HCVAP over 50% and those marked effective for Black voters have BCVAP over 40%. By contrast, the demonstration plan presented here features several effective districts with lower Latino and Black population percentages. For example, the Austin-based District 27 is a Latino-effective district with an HCVAP a shade under 40%, and the Houston-based District 9 is a Black-effective district with a BCVAP of only 28.6%. We emphasize that each

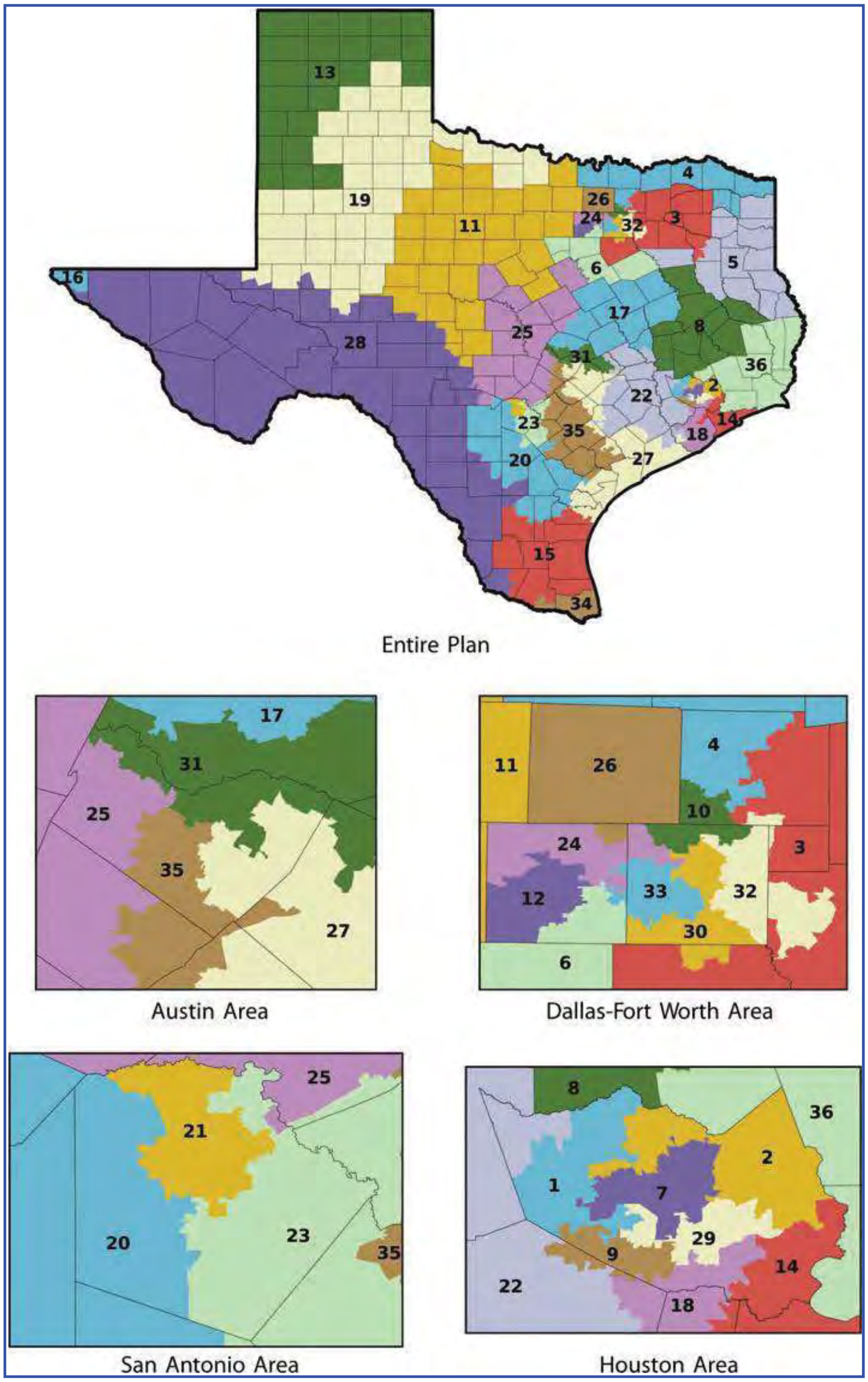


FIG. 11. An interesting demonstration plan found by heuristic optimization.

of those demonstration districts earned its effectiveness score by voting for the Latino- or Black-preferred candidates, respectively, in nearly every statewide election conducted in the last decade.

This map refutes the notion that demographics is destiny when it comes to Texas congressional districts. It contains districts that are majority-minority but not minority-effective (District 2), majority-white but Latino-effective (District 35), plurality-white but Black-effective (Districts 9, 30, and 32) or Latino-effective (Districts 27 and 29), and plurality-Latino but Black-effective

– Ex. 11264 –

Table 6. Statistics for Effective Districts in Demonstration Texas Congressional Plan

Demonstration Plan

CD	Location	HCVAP %	Latino effective s^{unw}	Latino effective s^{state}	Latino effective s^{dist}	BCVAP %	Black effective s^{unw}	Black effective s^{state}	Black effective s^{dist}	WCVAP %	14 Primaries Latino	14 Primaries Black	14 Gen (Dem.)
7	Houston	36.5	77	65	77	25.5	70	58	31	31.4	9–13	9–10	14
9	Houston	23.3	40	30	33	28.6	78	66	75	31.5	10–12	10–12	14
15	South Texas	78.8	97	98	96	1.7	8	9	6	17.5	12–14	10–11	14
16	El Paso	76.1	99	99	97	4.2	11	12	10	17.4	13–14	11–14	14
18	Houston	32.0	66	59	63	30.7	76	77	69	30.4	10–13	10–12	14
20	San Antonio	60.6	77	82	76	5.5	10	11	9	30.9	12–14	12–13	9
21	San Antonio	47.5	35	74	79	5.6	8	8	8	42.9	12–14	10–14	7
23	San Antonio	51.1	77	82	79	10.7	14	15	14	34.7	12–14	10–12	9
27	Austin/Gulf Coast	39.8	84	85	85	8.8	17	16	18	47.7	12–13	10–14	13
28	South/West Texas	81.4	91	95	96	1.0	7	8	6	16.6	11–14	9–11	14
29	Houston	33.4	70	57	75	25.5	70	58	52	35.5	9–11	9–12	14
30	DFW	15.5	20	15	13	31.8	85	84	69	48.5	9–10	10–11	14
32	DFW	24.1	24	26	28	24.4	52	67	62	44.9	10–13	12–14	10
33	DFW	37.0	85	80	66	32.9	96	97	88	25.1	10–11	13	14
34	South Texas	86.7	97	98	97	0.4	6	7	5	12.3	11–14	9–11	14
35	Austin	30.7	62	62	67	4.8	10	10	9	60.6	11–13	9–10	14

District 27 (with statewide candidates of choice)

		Primary election Latino-pref.	Primary election Winner	Primary runoff election Latino-pref.	Primary runoff election Winner	General election Latino-pref.	General election Winner
President	2012	Obama	Obama ✓			Obama	Obama ✓
U.S. Senator	2012	Sadler	Sadler ✓	Sadler	Sadler ✓	Sadler	Sadler ✓
U.S. Senator	2014	Alameel	Alameel ✓	Alameel	Alameel ✓	Alameel	Cornyn ×
Governor	2014	Davis	Davis ✓			Davis	Davis ✓
Ag. Commissioner	2014	Friedman	Friedman ✓	Hogan	Hogan ✓	Hogan	Hogan ✓
RR Commissioner	2014	Brown	Brown ✓			Brown	Brown ✓
President	2016	Clinton	Clinton ✓			Clinton	Clinton ✓
RR Commissioner	2016	Yarbrough	Yarbrough ✓	Yarbrough	Yarbrough ✓	Yarbrough	Yarbrough ✓
U.S. Senator	2018	O’Rourke	O’Rourke ✓			O’Rourke	O’Rourke ✓
Governor	2018	Valdez	Valdez ✓	Valdez	Valdez ✓	Valdez	Valdez ✓
Lieutenant Governor	2018	Cooper	Collier ×			Collier	Collier ✓
Comptroller	2018	Mahoney	Chevalier ×			Chevalier	Chevalier ✓
Land Commissioner	2018	Suazo	Suazo ✓			Suazo	Suazo ✓
RR Commissioner	2018	McAllen	McAllen ✓			McAllen	McAllen ✓

The demonstration plan has up to 16 minority-effective districts, as shown in the top table, while the enacted plan has no more than 11 to 13 (compare Table 4 and accompanying text). Scores over 60% have darker shading, and scores in the 50–60% range have lighter shading. The frequency of primary and general election wins by minority-preferred candidates is shown in the last two columns. Because different candidates of choice can be identified by the statewide and district-specific method, the number of successes is given as a range. The bottom table shows that candidates preferred by Latino voters statewide prevailed in District 27 in 12 of the 14 primaries, 5 of the 5 runoffs, and 13 of the 14 general elections. (With the candidates of choice inferred from the district-specific method, there are 13 primary successes).

(the two coalition districts, 18 and 33). There are also districts that are reliably Democratic but are not effective for either Latino voters or Black voters (Districts 12 and 31).

Table 6 takes a single district and brings us back to the most basic facts about it: whether the minority-preferred candidates actually won the most votes. We use as an example the plurality-white but Latino-effective District 27, which starts in East Austin and stretches south toward the Gulf Coast. For 11 of the 14 offices, the candidate preferred by Latino voters statewide prevailed at every step in District 27: primary, runoff (when there was one), and general. In the 2014 general election, however, the Latino-preferred Democratic nominee David Alameel failed to carry District 27 against Republican incumbent U.S. Senator John Cornyn; and in the 2018 Democratic primaries for lieutenant governor and comptroller, the candidates preferred by Latino voters statewide (Michael Cooper and

Tim Mahoney, respectively) failed to carry the district. This district generated Latino-effectiveness scores of about 84 or 85%, far above our threshold for effectiveness (60%) but below the scores for the map's four most heavily Latino districts, which consistently exceeded 90%.

7.3. Aggregate effectiveness

The use of a search technique tailored to raise the number of minority-effective districts might lead us to wonder about the effect on the rest of the map. With respect to demographics alone, redistricting is a fixed-sum activity: there are only so many Latino citizens of voting age in the state, so building more districts with high HCVAP means there is less remaining HCVAP to distribute across the other districts. We might worry that we can only secure a larger number of effective districts by draining opportunities for coalitional influence from the rest of the state. But this is not the case. Because of the highly nonlinear relationship between demographics and effectiveness (see section 6), it is possible to create some plans with a greater overall effectiveness than others.

To see this, let us consider the sum of the effectiveness scores for all 36 Texas congressional districts. Because each district has a score between 0 and 1, the sum will fall between 0 and 36. To the extent that a group's effectiveness scores behave like probabilities of electoral success, the sum over the 36 districts can be regarded as the *expected value* for the group in a given election. This expected-value score takes into account the probability but not certainty of electoral success in the effective districts, and also includes contributions from other districts in which an effectiveness score could fall well below .5 yet still reflect real political influence and a chance to win.

The enacted plan has an expected-value score a bit under 12, driven by 11 highly effective districts. After a few thousand steps of a heuristic-

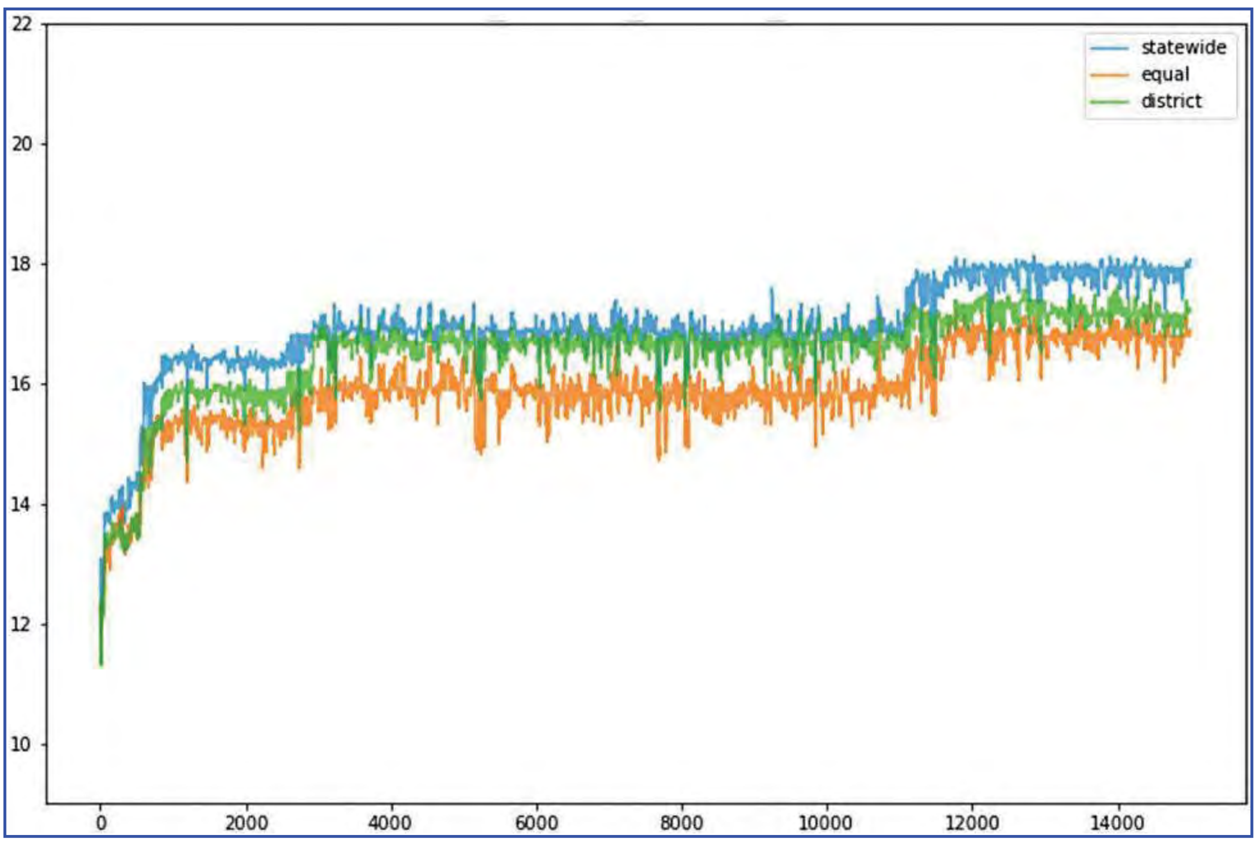


FIG. 12. This trace plot shows a kind of aggregate effectiveness for Latino and Black voters, formed by summing Latino and/or Black effectiveness scores over all 36 districts. This aggregate effectiveness trends up markedly over the course of a heuristic-optimization run that preferentially accepts plans with more districts effective for at least one minority group under the s^{state} score. This drives up the s^{state} score (in blue) most, with the other two scores following behind. (See Supplementary Appendix H for details on related optimization runs.)

optimization run (shown in Figure 12), the expected-value score is well over 15, usually over 16, and it is possible to drive the expectation up near 18 in the score being optimized. Our demonstration plan has an expectation of nearly 17, which tracks with the 16 districts highlighted in Table 6.

We find that, with respect to electoral opportunity, districting is not a fixed-sum game. We can find plans that combine Latino and Black voters with other population (including Asian American and white voters who tend to support the same candidates) in ways that lead to effective combinations. We can create safe minority districts, likely-to-elect minority districts, and some minority influence districts in a way that is especially beneficial in aggregate. This is a departure from the narrower focus on effectiveness that is directly relevant for VRA compliance, but may still point the way to a more coalitional expansion of minority opportunities beyond the demands of the law.

8. CONCLUSION

The principal goal of this project is the design and study of a protocol for building ensembles of alternative districting plans, taking closely into account the law of race and redistricting. We do this by using longitudinal electoral data, one of a choice of effectiveness scores, and a constrained district-generation algorithm.

No inclusion criterion assessed by a computer could perfectly track the conclusions of a court (not least because of variation in the judiciary itself), but ours is constructed to give us strong justification for describing it as a *representative sample* of the universe of VRA-compliant plans. We have pursued this objective in a way that also avoids overreliance on purely demographic targets that might run afoul of the Equal Protection Clause.

The structure of our protocol is described in section 4, and a detailed case study for Texas congressional districts is detailed in section 5. In section 6 we confirm that the role played by the extensive electoral data is not easily replaced by simpler proxies. And in section 7 we explore the use of similar techniques to minimize underrepresentation for minority groups—showing in particular that pushing to find plans that go the farthest to cure longstanding underrepresentation is a markedly different task from creating collections of alternatives that pass VRA muster. Studying the conditions of political and human geography that make it possible to attain near-proportionality is an interesting direction for future work.

With a detailed case study in the large, complex state of Texas, we confirm that our implementation lets us carry out the work on a time scale suitable for all stages of redistricting, from considering plans for possible adoption all the way to challenging them in litigation. We have made careful use of error estimates, performed tests of quality for ensemble generation, and confirmed robustness of the method across reasonable variations in the steps. By making our code and data public (MGGG Redistricting Lab, 2020a), we aim to make it possible for other researchers and practitioners to use this method on the ground.

This tool now makes it possible to assess proposed districting plans in racially diverse states against a baseline that takes the Voting Rights Act and the Equal Protection Clause into account. The computational tools for redistricting are continually becoming both more powerful and more refined, facilitating the creation of new maps that better meet our ideals of fairness and helping to understand maps in the context of realistic alternatives. By using novel tools in combination with renewed commitment to safeguarding minority representation, we can come closer than ever to the goal articulated by John Adams almost 250 years ago, in the midst of the American Revolution: to make our representative assemblies "in miniature an exact portrait of the people at large" (Adams, 1776, 108).

SUPPLEMENTARY MATERIAL

Supplementary Appendix

REFERENCES

Abbott v. Perez. 2018. 138 S. Ct. 2305.

Abrams v. Johnson. 1997. 521 U.S. 74.

Adams, John. 1776. "Thoughts on Government." In *The Founders' Constitution*, eds. Philip B. Kurland and Ralph Lerner. Chicago, IL: University of Chicago Press (1987).

Alabama Legislative Black Caucus v. Alabama. 2015. 575 U.S. 254.

Autrey, Eric, Daniel Carter, Gregory Herschlag, Zach Hunter, and Jonathan Mattingly. 2021. "Metropolized Forest Recombination for Monte Carlo Sampling of Graph Partitions." *arXiv.org*. arXiv:1911.01503.

Bartlett v. Strickland. 2009. 556 U.S. 1.

Becker, Amariah, and Justin Solomon. 2021. “Redistricting Algorithms.” In *Political Geometry*, eds. M. Duchin and O. Walch. Basel: Birkhäuser. Under contract.

Bethune-Hill v. Virginia State Bd. of Elections. 2017. 137 S. Ct. 788.

Bialik, Kristen. 2019. “For the Fifth Time in a Row, the New Congress Is the Most Racially and Ethnically Diverse Ever.” *Pew Research Center*. February 8. <https://www.pewresearch.org/fact-tank/2019/02/08/for-the-fifth-time-in-a-row-the-new-congress-is-the-most-racially-and-ethnically-diverse-ever/>.

Brown v. Thomson. 1983. 462 U.S. 835.

Bush v. Vera. 1996. 517 U.S. 952.

Bycoffe, Aaron, Ella Koeze, David Wasserman, and Julia Wolfe. 2018. “The Atlas of Redistricting.” *FiveThirtyEight*.<https://projects.fivethirtyeight.com/redistricting-maps/>.

Campos v. City of Baytown. 1988. 840 F.2d 1240 (5th Cir.).

Cannon, Sarah, Ari Goldbloom-Helzner, Varun Gupta, J.N. Matthews, and Bhushan Suwal. 2020. “Voting Rights, Markov Chains, and Optimization by Short Bursts.” *arXiv.org*. <https://arxiv.org/abs/2011.02288>.

Chen, Jowei. 2017. “The Impact of Political Geography on Wisconsin Redistricting: An Analysis of Wisconsin’s Act 43 Assembly Districting Plan.” *Election Law Journal* 16(4): 443–452.

Chen, Jowei, and Nicholas O. Stephanopoulos. 2021. “The Race-Blind Future of Voting Rights.” *Yale Law Journal* 130(4): 862–946.

Common Cause v. Lewis. 2019. No. 18 CVS 014001, 2019 WL 4569584 (N.C. Super. Ct., Wake Cty. Sept. 3) (three-judge court).

Cooper v. Harris. 2017. 137 S. Ct. 1455.

Cox v. Larios. 2004. 542 U.S. 947.

DeFord, Daryl, and Moon Duchin. 2019. “Redistricting Reform in Virginia: Districting Criteria in Context.” *Virginia Policy Review* 12(2): 120–146.

DeFord, Daryl and Moon Duchin. 2020. “Random Walks and the Universe of Districting Plans.” In *Political Geometry*, ed. M. Duchin and O. Walch. Basel: Birkhäuser. Under contract.

DeFord, Daryl, Moon Duchin, and Justin Solomon. 2021. “Recombination: A Family of Markov Chains for Redistricting.” *Harvard Data Science Review* 3(1). <https://doi.org/10.1162/99608f92.eb30390f>.

Duchin, Moon, and Bridget Tenner. 2018. “Discrete Geometry for Electoral Geography.” *arXiv.org*. <https://arxiv.org/abs/1808.05860>.

Duchin, Moon and Douglas M. Spencer. 2021. “Models, Race, and the Law: A Response to ‘The Race-Blind Future of Voting Rights.’” *Yale Law Journal Forum* 130:744–97.

Elmendorf, Christopher S., Kevin M. Quinn, and Marisa J. Abrajano. 2016. “Racially Polarized Voting.” *University of Chicago Law Review* 83(2): 587–692.

Fifield, Benjamin, Michael Higgins, Kosuke Imai, and Alexander Tarr. 2020. “Automated Redistricting Simulation Using Markov Chain Monte Carlo.” *Journal of Computational and Graphical Statistics* 29(4): 715–728. DOI: 10.1080/10618600.2020.1739532.

Grofman, Bernard, Lisa Handley, and David Lublin. 2001. “Drawing Effective Minority Districts: A Conceptual Framework and Some Empirical Evidence.” *North Carolina Law Review* 79(5):1383–430.

Hebert, J. Gerald, Paul M. Smith, Martina E. Vandenberg, and Michael B. DeSanctis. 2010. *The Realist’s Guide to Redistricting: Avoiding the Legal Pitfalls*, 2d edition. Chicago, IL: ABA.

Herschlag, Gregory, Han Sung Kang, Justin Luo, Christy Vaughn Graves, Sachet Bangia, Robert Ravier, and Jonathan C. Mattingly. 2020. “Quantifying Gerrymandering in North Carolina.’’ *Statistics and Public Policy* 7(1): 30–38.

History, Art, and Archives, U.S. House of Representatives, Office of the Historian. 2020a. “Black-American Members by Congress, 1870–Present.” *History, Art & Archives*. Available at <https://history.house.gov/Exhibitions-and-Publications/BAIC/Historical-Data/Black-American-Representatives-and-Senators-by-Congress/>.

History, Art, and Archives, U.S. House of Representatives, Office of the Historian. 2020b. “Hispanic-American Representatives, Senators, Delegates, and Resident Commissioners by Congress, 1822–Present.” *History, Art & Archives*. Available at <https://history.house.gov/Exhibitions-and-Publications/HAIC/Historical-Data/Hispanic-American-Representatives,-Senators,-Delegates,-and-Resident-Commissioners-by-Congress/>.

Iowa Code § 42.4.4. N.d.

Iowa Const. art. III, § 37. N.d.

Johnson v. De Grandy. 1994. 512 U.S. 997.

Karcher v. Daggett. 1983. 462 U.S. 725.

King, Gary. 1997. *A Solution to the Ecological Inference Problem: Reconstructing Individual Behavior from Aggregate Data*. Princeton, NJ: Princeton University Press.

King, Gary, Ori Rosen, and Martin A. Tanner. 1999. “Binomial-Beta Hierarchical Models for Ecological Inference.” *Sociological Methods and Research* 28(1): 61–90.

Lau, Olivia, Ryan T. Moore, and Michael Kellermann. 2020. “eiPack: Ecological Inference and Higher-Dimension Data Management (R package).” Version 0.2-1. Available at <https://CRAN.R-project.org/package=eiPack>.

League of Women Voters of Mich. v. Benson. 2019. 373 F. Supp. 3d 867 (E.D. Mich.) (three- judge court), summarily vacated and remanded sub nom. Chatfield v. League of Women Voters of Mich., 140 S. Ct. 429.

League of Women Voters v. Commonwealth. 2018. 178 A.3d 737 (Pa.).

LULAC v. Perry. 2006. 548 U.S. 399.

McCartan, Cory and Kosuke Imai. 2021. “Sequential Monte Carlo for Sampling Balanced and Compact Redistricting Plans.” *arXiv.org*. <https://arxiv.org/abs/2008.06131>.

MGGG Redistricting Lab. 2018a. “Comparison of Districting Plans for the Virginia House of Delegates.” White Paper. <https://mggg.org/VA-report.pdf>.

MGGG Redistricting Lab. 2018b. “GerryChain Python package.” GitHub repository. <https://github.com/mggg/GerryChain>.

MGGG Redistricting Lab. 2018c. “MAUP Python package.” GitHub repository. <https://github.com/mggg/MAUP>.

MGGG Redistricting Lab. 2018d. “Study of Voting Systems for Santa Clara, CA.” White Paper. <https://mggg.org/santaclara>.

MGGG Redistricting Lab. 2019a. “Findings on the City of Lowell’s Election Systems.” White Paper. <https://mggg.org/lowell>.

MGGG Redistricting Lab. 2019b. “Study of Reform Proposals for Chicago City Council.” GitHub repository. <https://mggg.org/chicago>.

MGGG Redistricting Lab. 2020a. “Computational VRA.” GitHub repository. <https://github.com/mggg/VRA_ensembles>.

MGGG Redistricting Lab. 2020b. “GerryChainJulia Julia package.” GitHub repository. <https://github.com/mggg/GerryChainJulia>.

Miller v. Johnson. 1995. 515 U.S. 900.

National Conference of State Legislatures. 2020. “State Legislator Demographics.” *NSCL.org*. <https://www.ncsl.org/research/about-state-legislatures/state-legislator-demographics.aspx>.

Ohio A. Philip Randolph Institute v. Householder. 2019. 373 F. Supp. 3d 978 (S.D. Ohio) (three- judge court), summarily vacated and remanded, 140 S. Ct. 101.

Rucho v. Common Cause. 2019. 139 S. Ct. 2484.

Session v. Perry. 2004. 298 F. Supp. 2d 451 (E.D. Tex.) (three-judge court) (per curiam), vacated and remanded on other grounds sub nom. Jackson v. Perry, 543 U.S. 941.

Shaw v. Reno. 1993. 509 U.S. 630.

Smith v. Clinton. 1988. 687 F. Supp. 1310 (E.D. Ark.) (three-judge court), summarily aff’d, 488 U.S. 988.

Tennant v. Jefferson County Comm’n. 2012. 567 U.S. 758 (per curiam).

Texas Legislative Council. 2020. “Capitol Data Portal.” Available at <https://data.capitol.texas.gov>.

Thornburg v. Gingles. 1986. 478 U.S. 30.

Unger v. Manchin. 2002. 536 U.S. 935.

U.S. Bureau of the Census. 2019a. “American Community Survey: Citizen Voting-Age Population, by Selected Characteristics.” <https://data.census.gov/cedsci/table?q=S2901&tid=ACSST1Y2019.S2901>.

U.S. Bureau of the Census. 2019b. “American Community Survey: Citizen Voting-Age Population, by State.” <https://www.census.gov/library/visualizations/2016/comm/citizen_voting_age_population.html>.

U.S. Const. amend. XIV. N.d.

Voinovich v. Quilter. 1993. 507 U.S. 146.

VRA. 2020. 52 U.S.C. § 10301 et seq.

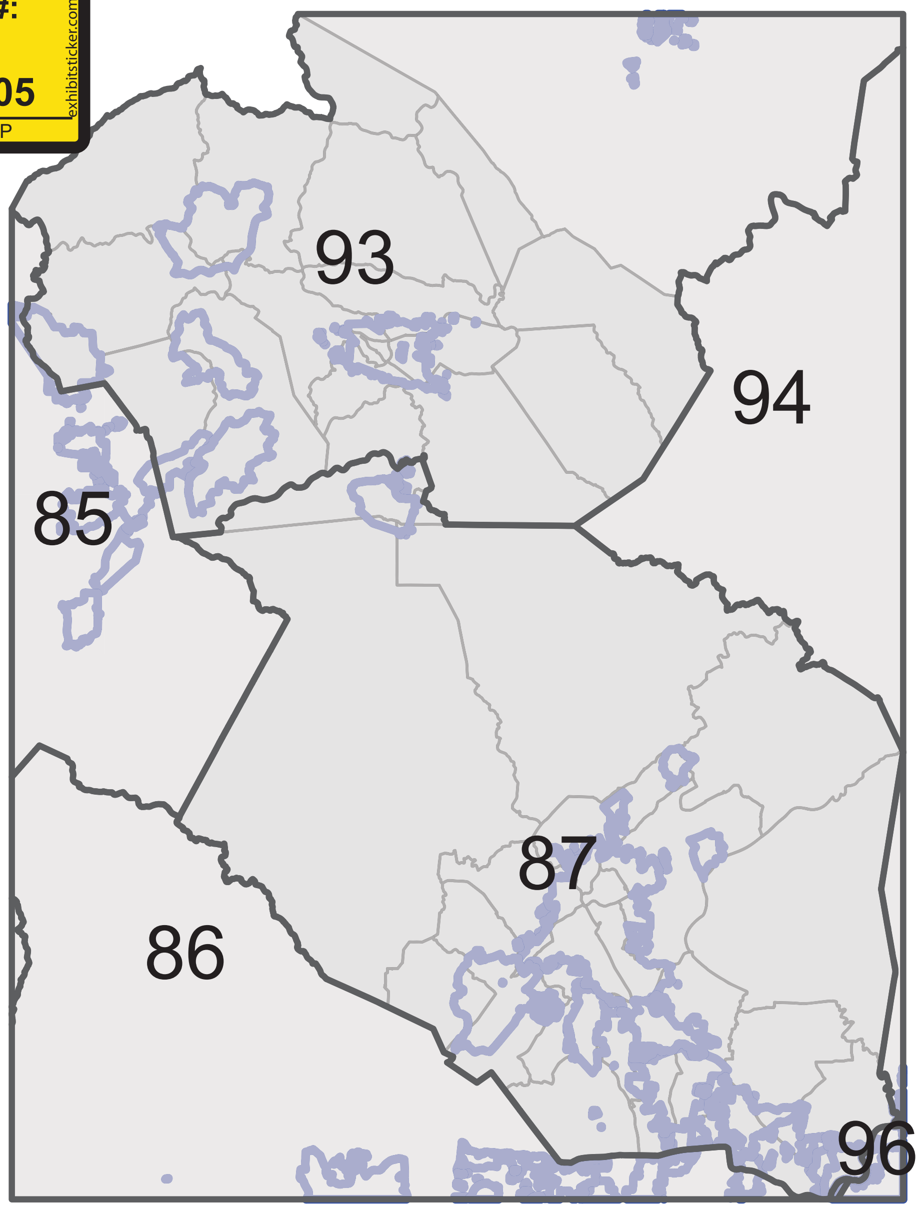
Address correspondence to:
Sam Hirsch
Jenner & Block LLP
1099 New York Avenue NW
Washington, DC 20001
USA

E-mail: shirsch@jenner.com

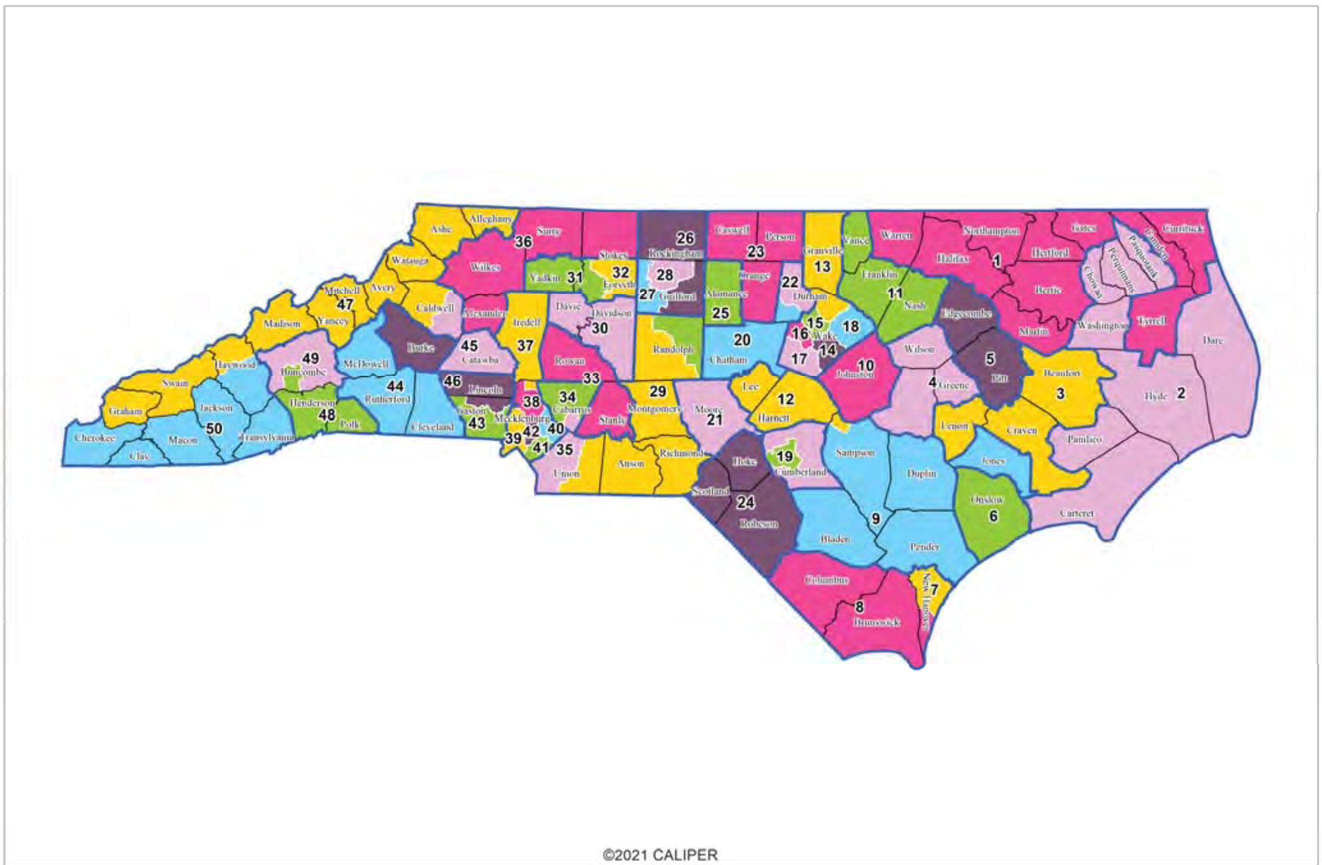
Received for publication November 24, 2020; received in revised form July 11, 2021; accepted July 19, 2021; published online October 18, 2021.

'Optimized' Map Districts in Caldwell and Watauga Counties, with Municipalities

Exhibit #:
Hirsch 05
12/09/21 - DLP
exhibitsticker.com



NCLCV v. Hall
21 CVS 15426
LDTX191

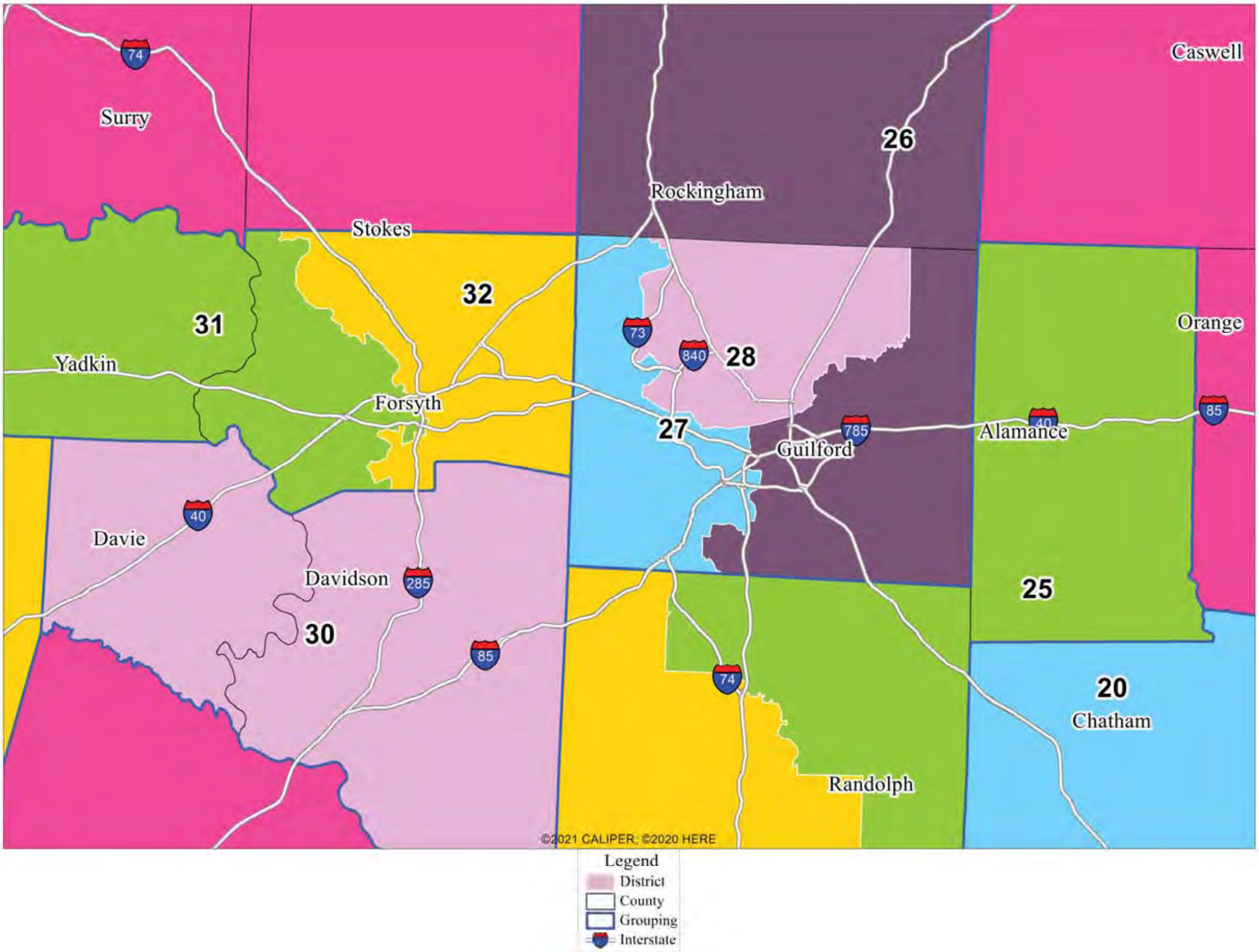


©2021 CALIPER

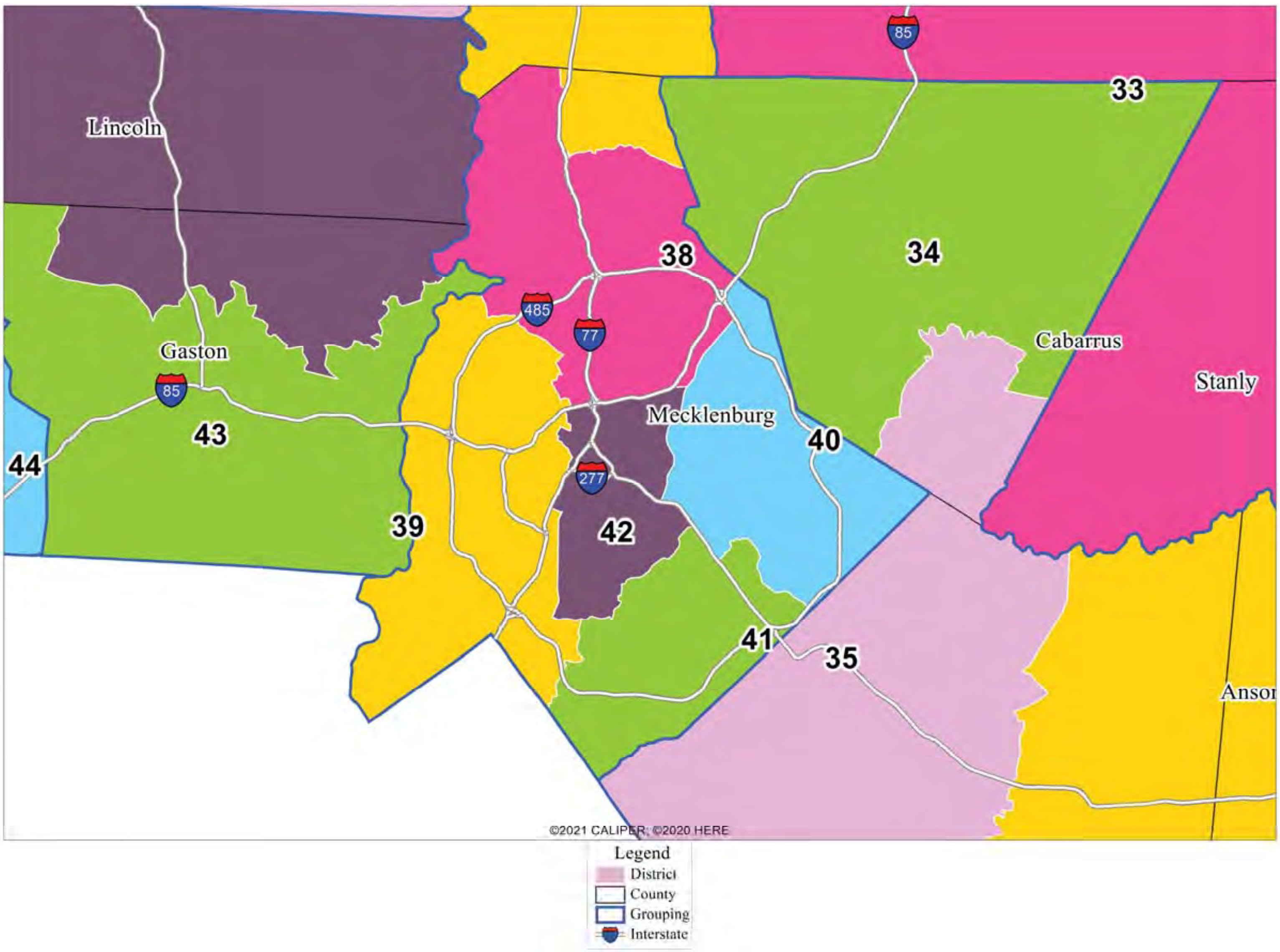
Legend
District
County
Grouping

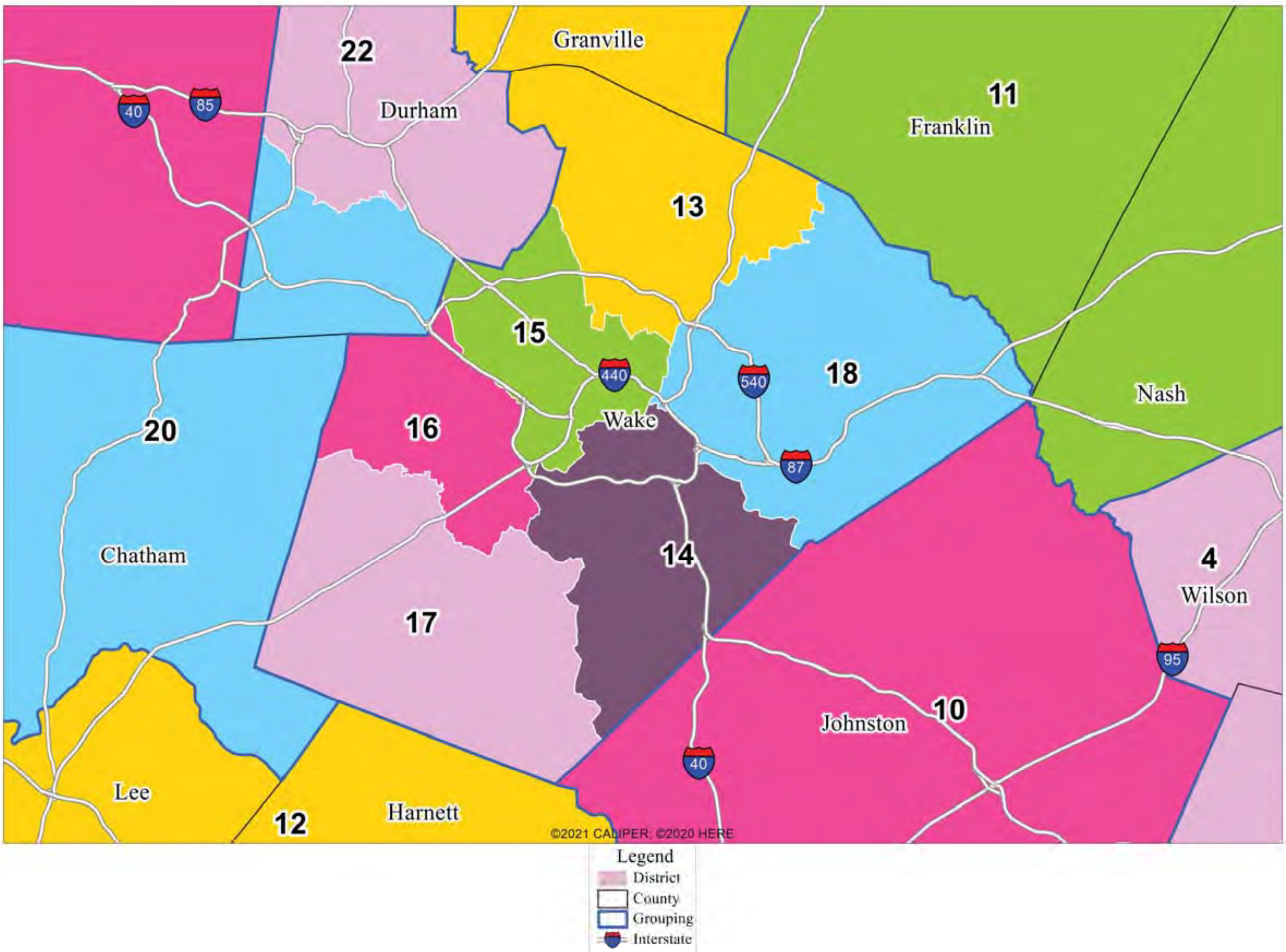
Exhibit #:
Hirsch 06
12/09/21 - DLP

NCLCV v. Hall
21 CVS 15426
LDTX192



Surry
Stokes
Rockingham
Caswell
26
32
31
Yadkin
Forsyth
28
27
Orange
Alamance
Guilford
Davie
Davidson
30
25
20
Chatham
Randolph
74
73
840
785
40
85
285
©2021 CALIPER; ©2020 HERE
Legend
District
County
Grouping
Interstate


Lincoln
Gaston
85
43
44
39
485
77
38
34
33
85
Cabarrus
Stanly
Mecklenburg
40
277
42
41
35
Anson
©2021 CALIPER; ©2020 HERE
Legend
District
County
Grouping
Interstate



22
Durham
Granville
13
11
Franklin
15
440
540
18
Nash
20
16
Wake
87
Chatham
14
4
Wilson
17
95
Johnston
10
40
85
Lee
12
Harnett
©2021 CALIPER; ©2020 HERE
Legend
District
County
Grouping
Interstate

NCLCV v. Hall
21 CVS 15426
LDTX195

Exhibit #
Mattingly 2
12/31/21 - MS
exhibitsticker.com

Expert Report on the North Carolina State Legislature and Congressional Redistricting (Corrected Version)

Jonathan C. Mattingly

December 23, 2021

Contents

1 Introduction

I am a Professor of Mathematics and Statistical Science at Duke University. My degrees are from the North Carolina School of Science and Math (High School Diploma), Yale University (B.S.), and Princeton University (Ph.D.). I grew up in Charlotte, North Carolina and currently live in Durham, North Carolina.

I lead a group at Duke University which conducts non-partisan research to understand and quantify gerrymandering. This report grows out of aspects of our group's work around the current North Carolina legislative districts which are relevant to the case being filed.

I previously submitted an expert report in Common Cause v. Rucho, No. 18-CV-1026 (M.D.N.C.), Diamond v. Torres, No. 17-CV-5054 (E.D. Pa.), Common Cause v. Lewis (N.C. Sup. Ct No. 18-cvs-014001), and Harper v. Lewis (No. 19-cv-012667) and was an expert witness for the plaintiffs in Common Cause v Rucho and Common Cause v. Lewis. I am being paid at a rate of $400/per hour for the work on this case. Much of the work derives from an independent research effort, unrelated to this lawsuit, to understand gerrymandering nationally and in North Carolina specifically. Much of the core analysis described in this report was previously released publicly as part of a non-partisan effort to inform the discussion around the redistricting process.

2 General Overview

I was asked in this case to analyze whether the enacted Congressional, state House, and state Senate redistricting plans for North Carolina were drawn intentionally for partisan advantage. In summary, to conduct our analysis, we used historic voting data to compare election results under the enacted plans with elections results under a collection of non-partisan maps generated using Markov Chain Monte Carlo methods, referred to throughout this report as an "ensemble." No partisan information is used to construct this ensemble of maps; only the generally accepted districting criteria of approximately equal population per district, contiguous and relatively compact districts, reducing traversals, and keeping counties, precincts, and possibly municipalities whole. One strength of the ensemble method is that it makes no assumptions in advance about what structure an election should have such as a relation to proportional representation or some type of symmetry considerations. Rather it shows what results would naturally occur, and the structure of those results, because of political geography of the state when non-partisan maps are used. We examine both the number of seats that would have been won under these vote counts, along with the expected margins of victory.

We see that each of the enacted plans is an extreme outlier with respect to its partisan properties in comparison to the ensemble. The Congressional, House, and Senate plans each systematically favor the Republican Party to an extent which is rarely, if ever, seen in the non-partisan collection of maps. Under many historic elections considered, each of the enacted maps elects significantly fewer Democrats than the typical number of Democrats found in the collection of maps. Specifically, the enacted Congressional plan produces 10 Republican seats and 4 Democratic seats across a wide range of historic elections, spanning roughly a 6-point differential in the statewide two-party vote share. In other words, Republicans win 10 congressional seats despite large shifts in the statewide vote fraction and across a variety of election structures. Over the statewide vote Democratic partisan vote range of 46.59% to 52.32%, the enacted map only twice changes the number of Republicans elected. The outcome of the election is largely stuck at 4 Democrats. Our non-partisan ensemble plans, by contrast, are far more responsive to changes in the election structure and the statewide vote fraction.

Under the enacted Senate and House plans, at times the Democratic Party is either denied a majority of seats or denied breaking a Republican supermajority when the overwhelming majority of maps in our ensemble would have resulted in either a Democratic majority or a simple Republican majority. In the Senate, we find instances in which the Republicans would have gained a supermajority under the enacted plan, but would have lost a supermajority in nearly every map in our collection. In the House, we find instances in which the Republicans won the supermajority of seats under the enacted plan but they would have not won the supermajority in the majority of maps in our collection.

In the House and Senate plans, the extreme statewide tilt towards the Republican Party is the result of a significant number of truly independent choices at the level of the county-clusters into which the state is divided. The chance of making so many independent choices which bias the results towards the Republican Party unintentionally, without corresponding choices favoring the Democratic party, is astronomically small.

In addition to this systematic bias towards the Republican Party which when aggregated produces highly atypical results, the enacted House and Senate plans also have highly atypical results in a number of county clusters even when viewed alone. Beyond often creating atypical results in terms of the number of seats won in a given cluster, our results also show a durability in the results in certain clusters under the enacted plans. By durable, we mean that the results remain atypically unchanged over a wide range of elections. This unresponsiveness to changes in vote counts is another problematic feature revealed by our analysis of the enacted plans.

Our analysis show that each of the three enacted plans is an extreme gerrymander over a range of voter behavior seen historically in North Carolina. The effect of these extreme gerrymanders is to prevent the Democrats from winning as many seats in Congress, the House, and the Senate as they would have had the maps been drawn in a neutral way without political considerations. In many cases, the enacted maps reduce the extent to which the results of an election respond to the changing options of the electorate as expressed at the ballot box.

3 Discussion on Interpreting The Ensemble Method

3.1 The Political Geography

In redistricting conversations, there are often discussions of the urban versus rural divide and natural packing. These points demonstrate the need for a methodology that accounts for this political geography; ensemble methods precisely capture it. The distribution on redistricting plans can distinguish between typical plans and atypical plans. This determination is fundamentally informed by the geometry of the state, its political geography, and the spatial structure of the elections used to probe the redistricting plan.

The fundamental power of the ensemble method is that it begins with a clear set of redistricting criteria as an input. It then creates a representative ensemble of redistricting plans which accounts for the geometry of the state and the geography of where people live and how they vote. Any collection of voting data can then be applied to this ensemble of restricting plans to obtain a collection of election results. The election results give a benchmark against which a particular redistricting may be compared under the same set of voting data. It is only the relative difference between the ensemble and the enacted plan which matters. Our ensemble of restricting plans naturally incorporates how nonpartisan redistricting criteria interact with the political geography and geometry of the state. It naturally adapts to natural packing in urban areas and other effects. It is capable of separating these natural effects from those of partisan gerrymandering. Because of this, this mode of analysis can separate bias that natural packing might induce from other effects.

Additionally, none of these analyses rely on any forms of partisan symmetry or ideas of proportional representation. The ensemble method does not impose any idea of fairness nor does it select for a particular seats-to-votes curve. Rather it illuminates what the result would have typically been had only the stated redistricting criteria been utilized. It is quite possible, and often happens, that the results from the ensemble method do not yield proportional representation and one party has a natural advantage relative to the statewide vote fraction. One can then use this natural advantage as a benchmark to detect when a particular plan is biased beyond the neutral standard the ensemble establishes.

3.2 Different Elections have Different Voting Patterns

Elections differ both in the statewide partisan vote fraction and the spatial patterns of voting across the state. Hence, it is not at all surprising that a given map can act differently under different voting patterns; even those that share the same statewide partisan vote fractions. For instance, a map could be designed to neutralize the effectiveness of a particular set of coalitions, and hence would only be a statistical outlier in elections when those coalitions are active.

On a number of occasions, we have seen maps that particularly show the effect of the Gerrymander when there is a danger that the majority or supermajority are lost. To better understand why this is natural, consider the following example. Let us assume that a region has three varieties of people who always vote as a block and are spatially contiguous. For definiteness, let us call them red, purple, and blue people. We will assume that red always vote for the red candidate and blue for the blue candidate. Sometimes the purple vote for the red candidate and sometimes for the blue candidate. Hence, sometimes red wins two seats, and sometimes three seats, depending on how the purple people vote. Let us assume that most redistricting plans that one would naturally draw (without knowing where the red, purple, and blue people lived) would produce 2 majority red districts, 2 majority blue districts, and one majority purple district. We will call these neutral plans. Now let us consider a plan which is carefully drawn so that the purple people are never a majority but rather the purple people are split such that there are three majority blue districts and two majority red. We will call this the gerrymandered plan.

Under the gerrymandered plan the red candidates always win two of the five seats, but never more. This is typical of elections where the purple people vote with the blue people. It is typical because the majority purple district in the neutral plans would vote for the blue candidate to elect three blue candidates. On the other hand, in elections where the purple people vote with the red people, the outcome would be highly atypical as the neutral maps would have always produced three red winners but the gerrymandered plan only produces two red winners. In summary, atypical maps may lead to a typical split of elected officials under some vote counts, but not under others. It is not unusual for gerrymandered maps to sometimes produce typical results.

3.3 Collected Seat Histograms and Uniform Swing Analysis

It is a misconception that a gerrymandered map will behave atypically under all different types of elections. Gerrymandered maps can behave atypically under some types of elections and typically under other types of elections. For example, a map may only become atypical when a party is in danger of losing the majority. We demonstrate this through a type of plot we call *Collected Seat Histograms*. The election data use can either be historical elections or data generated using a uniform swing hypothesis.[1]

In both cases, we plot the histograms tabulating the fraction of the ensemble maps which produce a particular number of Democratic seats under a particular choice of statewide votes (tabulated at the precinct level). We then collect these histograms on a single plot where they are arranged on the vertical axis according to their statewide vote fractions, with the most Republican at the bottom and the most Democratic at the top. On each of the individual histograms, we also place a mark corresponding to the number of seats the enacted map would produce using those votes. Using these plots, one can identify trends and types of elections were the enacted maps products outlier results. When considering the NC State House and Senate, we also place vertical lines on each plot to mark where the supermajorities are in effect and where the simple majority in the chamber changes hand.

In addition to using historical statewide votes to produce our Collected Seat Histograms, we also create a collection of Collected Seat Histograms built from a single historical vote which is shifted using the Uniform Swing Hypothesis to produce a collection of votes which preserve the relative voting pattern across the state while seeing the effect of shifting the partisan tilt of the election.

Both kinds of Collected Seat Histograms are effective at identifying maps that are non-responsive to changing voter opinions or under-respond to those changes. A district map that results in different representation when the number of votes for a particular party changes sufficiently is a minimal requirement of a democratic process that is responsive to the changing will of the people. The Collected Seat Histograms can be used to determine the level of responsiveness to changes in the votes one should expect of the maps that were drawn without a partisan bias. The Rank Ordered Boxplots in the next section can help illuminate the structure of the map which is responsible for any systematic bias or lack of responsiveness relative to the nonpartisan benchmark embodied in the ensemble.

[1]The uniform swing hypothesis takes a single election and then uniformly increases (or decreases) the percentage for a given party across all the predicts. This creates a new set of voting data with the same spatial structure but a different statewide partisan percentage for each party.

3.4 Structure of Maps and Rank-Ordered Marginal Boxplots and Histograms

While the partisan seat count is clearly a quantity of interest, it can be less effective at illuminating the structure of a map that also explores how the elections are won. To this end, we introduce the *Rank-Ordered Marginal Boxplots and Histograms*. These are formed by considering the partisan vote fraction for one of the political parties (say the Democrats, or equally the Republicans) in each of the districts for a given redistricting plan. These marginal vote fractions are then ordered from smallest to largest, that is to say; from most Republican district to most Democratic district. These ordered numbers are then tabulated over all of the plans in the ensemble.

The Rank-Ordered Marginal Boxplots plot the typical range of the most Republican district to most Democratic district. Ranges are represented by box-plots. In these box-plots, 50% of all plans have corresponding ranked districts that lie within the box; the median is given by the line within the box; the ticks mark the 2.5%, 10%, 90% and 97.5% quartiles; the extent of the lines outside of the boxes represent the range of results observed in the ensemble. The number of boxes is the same as the number of seats. That is 120 seats for the NC House, 50 seats for the NC Senate, and 14 seats for the NC Congressional Delegation. Any box that lies above the 50% line on the vertical axis will elect (or typically elect) a Democrat; any box that lies below the 50% line will elect (or typically elect) a Republican.

We take the enacted plan with each set of votes and plot the ordered district returns over the box plots. If the districts of an enacted plan lie either far above or far below the ensemble at a particular ranking, this can indicate that the district was either packed or cracked to provide an atypical result.

4 State Legislature

Using historic voting data, we compare election results under the enacted districting plans for the North Carolina House and North Carolina Senate with election results under a collection of non-partisan maps. One strength of this method is that it makes no assumptions in advance about what structure an election should have such as a relation to proportional representation or some type of symmetry considerations. We examine both the number of seats that would have been won under these vote counts, along with the expected margins of victory.

4.1 State Legislature: Overview of Findings

4.2 State Legislature: Overview of Method

We generate a collection of alternative restricting maps using Markov Chain Monte Carlo methods, and used this collection to characterize what would be expected if only non-partisan redistricting criteria where used. We have described this method in detail in our academic work. See [7, 3, 8, 10, 1, 2]. (References in this report to numbers in brackets are to articles cited in a numbered bibliography at the end of this report). No partisan information is used to construct this ensemble of maps; only the generally accepted districting criteria of approximately equal population per district, contiguous and relatively compact districts, reducing traversals, and keeping counties, precincts, and municipalities whole.

For both the NC House and NC Senate, we generate a *Primary Ensemble* whose non-partisan properties are close to those of the enacted plan. Because of this, we sometimes label this plan as the *Matched Ensemble*. For both the NC Senate and NC House, we produce a *Secondary Ensemble* which makes different policy choices concerning the preservation of municipalities. In a third ensemble built, we also consider the pairing of incumbents.

The ensembles are generated by using the Metropolis-Hasting Markov Chain Monte Carlo Algorithm in a parallel tempering framework which employs proposal from the Multiscale Forest RECOM algorithm [2, 1] and the single-node flip algorithm [7]. Using these proposals, the Metropolis-Hasting algorithm is then used to produce samples from the desired policy-informed, non-partisan distribution on redistrictings; such algorithms are widely accepted for sampling high-dimensional distributions. The Markov Chain Monte Carlo and Metropolis-Hasting algorithms are a cornerstone of modern computational statistics, protein folding and drug discovery, and weather prediction. They date back to at least the Manhattan Project in Los Alamos are used in a huge range of mathematical and statistical applications.

The distributions we use are defined to be concentrated on districting plans that contain districts near the ideal district population based on the one-person-one-vote principle (including the 5% population deviation acceptable for legislative districts). They are also designed to produce contiguous districts that are relatively compact and to reduce the number of counties and, in some cases, the number of people split out of a municipality. For the Primary Ensemble, the distribution on redistricting plans is tuned so that these non-partisan qualities, including the number of counties, municipalities, and precincts which are split, are similar to the enacted plan. We also respect the county-clustering requirement for State Legislative maps.

We will see that the enacted NC Senate preserves municipalities to a high degree; in a way consistent with the most municipality preserving distributions we could produce. Hence, we also provide a *Secondary Ensemble* for the NC Senate which does not explicitly preserve municipalities (thought compactness and the county preservation lead to a degree of municipality preservation.) It coincides with the primary ensemble properties in other resects.

For the NC house, we will see that the enacted plan is not as stringent in its municipality preservation, and that respecting the other criteria could naturally create many plans that better preserve municipalities than the enacted plan. Since we have tuned our primary ensemble to match the level of municipality preservation in the enacted plan, which include a Secondary Ensemble for the NC house we is better at preserving municipalities.

As the guidance from the legislature at the start of the redistricting process stated that one "may consider municipality preservation" (in contrast to other directives which were not optional), all four of these ensembles meet the guidance given by the legislature. As already mentioned, we also provide a third ensemble for both the NC house and NC Senate which is derived from the primary ensemble, but considers the double-bunking of incumbents.

In all cases using the Metropolis-Hasting Markov Chain Monte Carlo Algorithm, we can produce a mathematically representative sample of the redistricting plans that comply with the criteria described.

4.3 County Clusters for State Legislature

In Stephenson v. Bartlett, 562 S.E.2d 377 (N.C. 2002), the North Carolina Supreme Court ruled that North Carolina's state legislative districts should be clustered into groups of counties and that no district should cross between two of the "county clusters." As part of our non-partisan work concerning redistricting, we implemented the algorithmic part of the Stephenson Ruling in a publicly available open-source piece of software [4]. We used this computer software to produce the county clusterings used in this report. The resulting clusterings were described in our publicly released report which can be found here [5]. We understand that the NC Legislature also used this report to determine the possible clusterings. In any case, the clusterings we found coincide with those discussed by the legislature.

There is not a unique choice of statewide clustering. Rather there are parts of the state which can only be clustered in one way, while there are two ways to cluster the counties in other regions. In the state Senate, there are 17 clusters containing 36 of the 50 districts that are fixed based on determining optimal county clusters. These are represented by the color county groupings in Figure 4.3.1. The white numbers annotating each county clustering give the number of districts that the county cluster should contain. Ten of these clusters contain one district, meaning that ten of the 50 senate districts are fixed by the county clusters. The remaining county clusters must be further subdivided into legislative districts. The remaining 14 counties, shown in gray on the map in Figure 4.3.1 are distributed among four groups, each containing two clustering options. Following the nomenclature in [5], we will label the cluster groups by the letters A, B, C, and D . Each group consists of two different possible clusterings which we will label with the numbers 1 and 2. Thus, the first choice in cluster A is labeled A1, and the second choice A2. A complete choice of county clusters then consists of one choice from the A group, the B group, the C group, and the D group.

Similarly, in the NC State House, there are 33 clusters containing 107 of the 120 districts that are fixed based on determining optimal county clusters. These are represented by the color county groupings in Figure 4.3.2. Again, the white numbers annotating each county clustering give the number of districts that the county cluster should contain. Eleven of these clusters contain one district, meaning that eleven of the 120 house districts are fixed by the clustering process. The remaining clusters (shown in gray) are separated into three groups each containing two clustering options. As before, the groups will be demoted by the letters A, B, and C with each of the two options in each group labeled with the numbers 1 or 2.

More details can be found in [5] and [4]. It should be noted that the algorithm used to produce these clusterings only implements the algorithmic portion of the Stephenson v. Bartlett. In particular, it does not address any compliance with the Voting Rights Act.

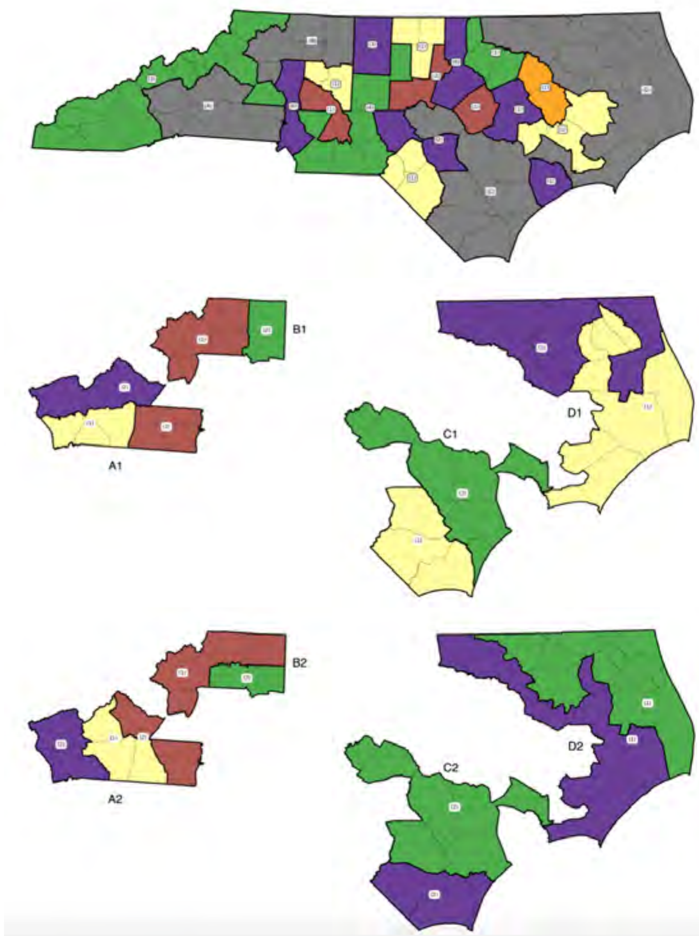


Figure 4.3.1: Senate

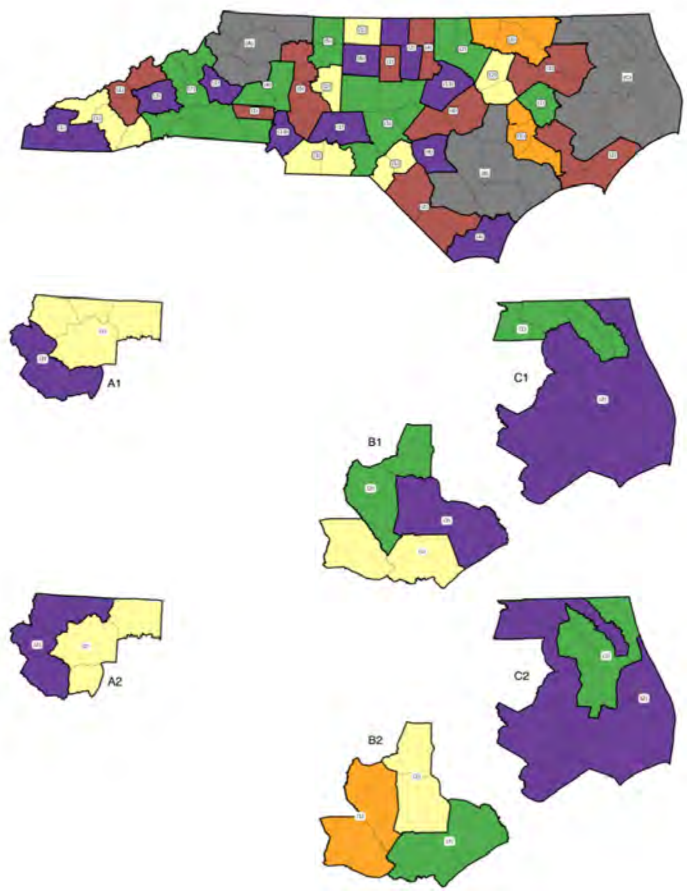


Figure 4.3.2: House

4.4 State Legislature: Ensemble Overview

We now give more details on the different distributions already sketched in Section 4.2. They represent different distributions that emphasize different policies consistent with the Legislature's guidance and historical presidents. All the distributions from which we build our ensembles respect the county clusters we derived in [6] by algorithmically implementing the ruling Stephenson v. Bartlett, 562 S.E.2d 377 (N.C. 2002). That is to say in both the State House and State Senate, the state is segmented into groups of counties referred to as *county clusters* so that the population of each county cluster can be divided into a number of districts each with a population within 5% of the ideal district population. The county clusters are different for the State House and State Senate as the number of districts, and hence the ideal district populations, are different. Each district is constrained to lay entirely within one county cluster.

Beyond the county cluster requirement all of our primary and secondary ensembles for both chambers also satisfy the following constraints:

- The maps minimize the number of split counties. The 2021 redistricting criteria state that "Within county groupings, county lines shall not be traversed except as authorized by Stephenson I, Stephenson II, Dickson I, and Dickson II."
- Districts traverse counties as few times as possible.
- All districts are required to consist of one contiguous region.
- Except for two exceptions, the deviation of the total population in any district is within 5% of the ideal district population. The two special cases are explained in Section 7.2.
- Voting tabulation districts (i.e. VTDs or precincts) are not split (see again the two exceptions with population deviation in Section 7.2)
- Compactness: The distributions on redistricting plans are constructed so that a plan with a larger total isoperimetric ratio is less likely than those with a lower total isoperimetric ratio. (See Section 7.2 and 8.1 for a definition of the isoperimetric ratio.) The total isoperimetric ratio of a redistricting plan is simply the sum of the isoperimetric ratios over each district. The isoperimetric ratio is the reciprocal of the Polsby-Poper score; hence, smaller isoperimetric ratio corresponds to larger Polsby-Poper scores. The General Assembly stated in its guidance that the plans should be compact according to the Polsby-Popper score or the Reock score [9]. We have found that while the Reock is useful when comparing two districts. However, the Polsby-Popper/isoperimetric score is a better measure when generating district computationally. In our previous work, we have seen that this choice did not qualitatively change our conclusions (see [7] and the expert report in Common Cause v. Rucho).

  We tuned our primary ensemble so that compactness scores of the ensemble were comparable to those of the enacted plan. See Section 7, for plots showing the compactness scores.

Municipality Preservation: We now come to the property which distinguishes the Primary and Secondary ensembles. In both chambers of the NC Legislature, we tune the primary ensemble to match the level of municipalities preservation to those seen in the enacted plan. Since municipality preservation is concerned with keeping the voters of a particular municipality together as a block, we concentrate on the number of *ousted voters*. Ousted voters are those who have been removed from the districts which primarily contain the other members of the municipalities. We construct the ensemble to control the total number of ousted voters across the entire state. More details are given in Section 7.2. As already mentioned, we tune the Secondary ensembles differently for the two chambers. Since the Enacted Senate plan was at the lowest end of municipality splitting we observed, we have included a secondary ensemble in the Senate which did not explicitly consider municipality reservation. In the NC House, since the enacted plan did not preserve municipalities to the level we found possible, we included a secondary ensemble which better preserved municipalities.

Incumbency: The effect of incumbency are addressed in a subsequent section of this report.

4.5 Construction of Statewide Ensembles for State Legislature

Statewide ensembles are created by drawing samples from a number of "sub-ensembles." Because of the county cluster structure, we can sample each county cluster independently of the other county clusters. In the house, we sample the Wake and Mecklenburg county cluster groups separately from the rest of the state as they have many more precincts and districts. In the Senate, we sample the Wake county cluster independently since it must split precincts to achieve the 5% population balance. There are several regions of the state that have multiple options for county clusters and we sample each of the county clustering options separately. We then sample the remainder of the state together.

We combine these sub-ensembles by first choosing which of the county clustering options will be used, treating all options equally. With these fixed, we then choose a map from each of the other sub-ensembles and combine them to produce a statewide map. We used this procedure to create an ensemble of 100,000 maps. These ensembles of statewide maps were used to generate the various figures. This number was chosen as it proved to be sufficient for the statistics of the quantities of interest to have converged. That is to say that adding additional maps to the ensemble did not change the results. See Section 7.1 for more details on the sampling method.

4.6 Election Data Used in Analysis

The historic elections we consider are from the year 2016 and 2020. We only consider statewide elections. We will use the following abbreviations: AG for Attorney General, USS for United States Senate, CI for Commissioner of Insurance, LG for Lieutenant Governor, GV for Governor, TR for State Treasure, SST for Secretary of State, AD for State Auditor, CA for Commissioner of Agriculture, and PR for United States President. We add to these abbreviations the last two digits of the year of the election. Hence CI16 is the vote data from the Commissioner of Insurance election in 2016.

5 State Legislature: Main Statewide Analysis

Our analysis shows that the enacted plan for the NC State House is an extreme gerrymander over a wide range of voter behavior seen historically in NC. The effect of this extreme gerrymander is to prevent the Democrats from winning as many seat as they would have had the maps been drawn in a neutral way without political considerations. This gerrymander is achieved by packing Democrats in a number of the most Democratic districts while depleting them from those districts which typically change hands when the public changes its expressed political opinon through the vote. The effect is particularly strong in situations where the Democrats would typically reduce a Republican supermajority to a a simple majority. The enacted map often denies this transition. Similarly the enacted map again behaves in an anomalous fashion by under electing democrats when the typical maps would almost always give the Democrats the majority in the House. This extreme outlier behavior is reflected in the behavior we see at the individual cluster level.

The effect in the Senate is less pronounced. At the cluster level there are a number of strong and extreme outliers signaling extreme partisan gerrymandering. At the statewide level, the structure of the map shows it to be an extreme outlier in the fashion in which Democrats are packed in certain districts and depleted from others. The effect at the statewide level is mostly seen when the Republicans are in danger of losing the supermajority in the Senate. Over this range the anomalous packing and cracking of Democrats leads to a number of extreme outlier behaviors which result in the Republicans maintaining the supermajority when they typically would have lost it under a non-partisan map from the ensemble.

Additionally we see that the reason that the Senate map is typical in many situations stems from the choice to highly conserve municipalities. The municipality preservation is at the extreme end of what we have observed. In contrast, the municipality preservation in the house is less extreme as we can easily create an ensemble which preserves municipalities to a higher degree. For the Senate plan, relaxing the requirement to preserve municipalities leads to an ensemble that is more favorable to the Democrats, meaning that the enacted plan would be an extreme outlier in more situations. Put differently, prioritizing municipality preservation in the Senate plan appears to enable more maps that favor Republicans. By contrast, for the House plan, where the enacted map does not prioritize preserving municipalities, my analysis finds that such a prioritization would not have favored the Republican party.

5.1 NC State House

Figure 5.1.1 shows the distribution of Democratic seats elected under a number of historical elections which capture plausible voting patterns in North Carolina elections. The elections are arranged vertically by the statewide Democratic vote share, from most Republican at the bottom to the most Democratic at the top. The Democratic seats elected under each election by the enacted plan is marked with a yellow dot.

It is important to remember that the single number of statewide vote fraction is not sufficient to categorize an election. Elections with similar statewide vote fractions can have dramatically different seat counts since the votes can be concentrated differently geographically. An example of this is shown in Figure 5.1.8 which shows the Collected Seat Histograms for an ensemble that places more weight on preserving municipalities that the enacted plan or the primary ensemble. Notice that the AG20 votes produce more democratic seats typically than either AG16 or GV16 even though the statewide vote fraction of AG20 is sandwiched between AG16 and GV16. (Recall the definitions of these abbreviations given in Section 4.6.)

Returning to Figure 5.1.1, we see that the enacted map is atypical in its favoring of the Republican party in every one of the elections considered and an outlier or extreme outlier in the vast majority of the elections. Additionally, the enacted plan is an extreme outlier when the Republicans are likely to lose either the Super-majority or control of the chamber. Observe that in the vast majority of plans in the primary ensemble (Figure 5.1.1) the votes in PR16, LG20 and CL20 produce a simple majority for the Republican party in the NC State House (and not a supermajority). Yet under the enacted plan, the Republican Party maintains the supermajority in all three cases.

Similarly, in a large number of the ensemble plans the Democrats hold the majority in the chamber under the voting patterns given by AD20, SST20, and GV20. (Under GV20 the Democrats have the majority most of the time, under AD20 roughly half the time and under SST roughly 75% of the time.) Yet, under the enacted plan the results are extreme outliers, giving the Republicans the majority with a safety margin of a few seats in all cases.

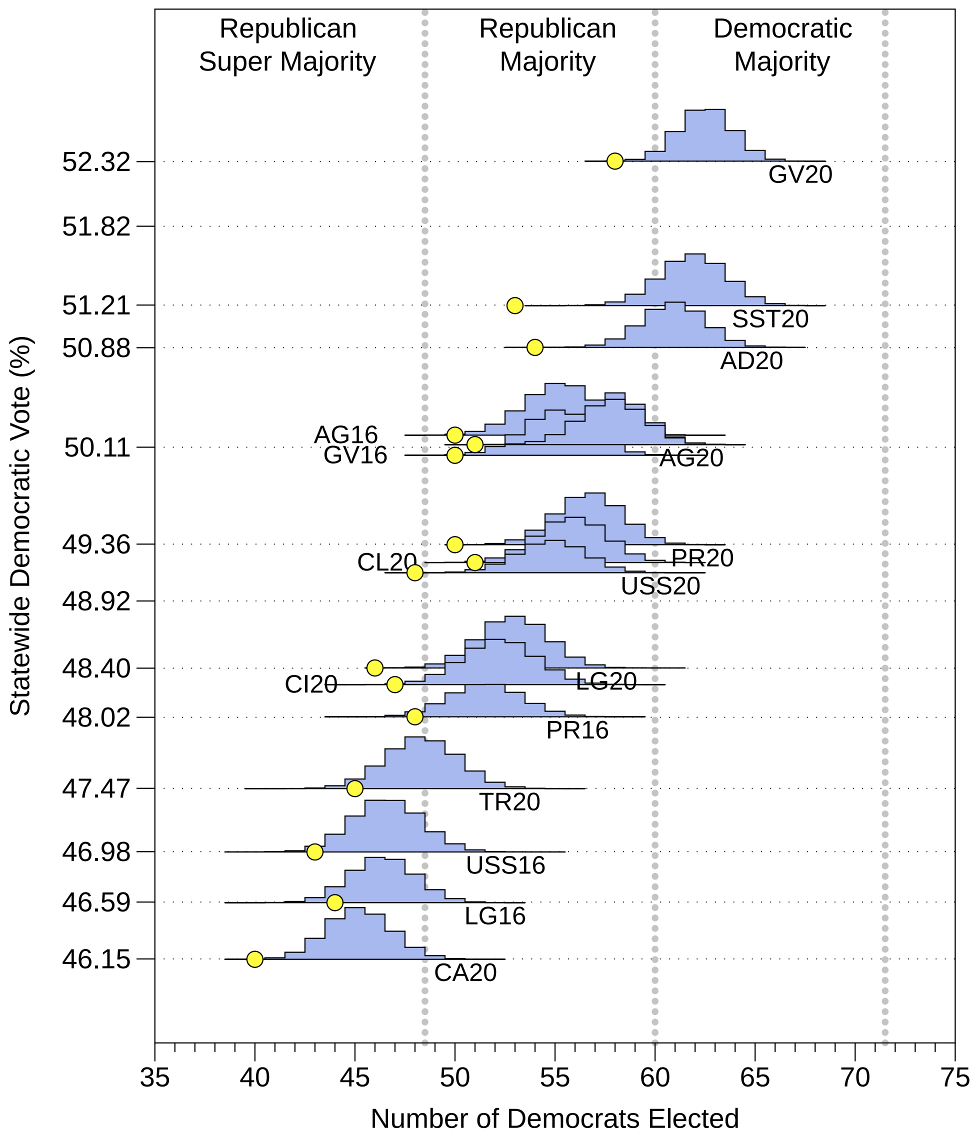


Figure 5.1.1: The Collected Seat Histogram for the Primary Ensemble on the NC House. The individual histograms give the frequency of the Democratic seat count for each of the statewide elections considered from the years 2016 and 2020. The histograms are organized vertically based on the statewide partisan vote fraction for each election. The more Republican elections are placed lower on the plot while more Democratic elections are placed higher. Three dotted lines denote the boundary between where the supermajorities and simple majorities are in force. The yellow dot represents the enacted plan.

As already observed, Figure 5.1.1 helps to identify the properties of the Enacted Map under different electoral environments. There is a clear trend as one moves to more Democratic elections, the atypical results (already tilted to toward

% Dem	Election	% Outlier	# Outlier	# Samples
52.32%	GV20	0.118%	118	100000
51.21%	SST20	0.000%	0	100000
50.88%	AD20	0.007%	7	100000
50.20%	AG16	0.451%	451	100000
50.13%	AG20	0.005%	5	100000
50.05%	GV16	0.399%	399	100000
49.36%	PR20	0.007%	7	100000
49.22%	CL20	0.759%	759	100000
49.14%	USS20	0.012%	12	100000
48.40%	LG20	0.009%	9	100000
48.27%	CI20	0.461%	461	100000
47.47%	TR20	5.569%	5569	100000
46.98%	USS16	3.066%	3066	100000
46.59%	LG16	11.778%	11778	100000
46.15%	CA20	0.094%	94	100000

Table 1: NC House Collected Seat Histogram Outlier Data. Starting from the left, the first column gives the statewide partisan makeup of the of the election under consideration whose abbreviation is given in the second column from the left. The right most column gives the total number of plans in the ensemble considered which is 100,000. The second column from the right gives the number of those 100,000 plans which elect the same or less Democrats under the given election. These are the plans which are as much or more of an outlier than the enacted map. The middle column is the percentage of plans which are more or equal of an outlier. (It is calculated by dividing the 2nd column from the right by 100,000 and multiplying by 100 to make a percentage.) The extremely low percentages in the middle column shows that the enacted plan is an extreme outlier across many different electoral settings.

the Republican party) in the more Republican elections in Figure 5.1.1 trend into extreme outliers as we shift to the more Democratic leaning elections.

To make the above table more quantitative, in Table 1 we tabulated the number of maps which produced the same or fewer seats for the Democrats in each of the elections we consider. We see that the enacted map is an extreme outlier. Across the vast majority of elections, the house map behaves as an extreme outlier in favor of the Republican party.

In the three elections where the results are not an extreme outlier (TR20, USS16, and LG16), the enacted plan is still atypically tilted to favor the Republican party. These three elections have a strong statewide Republican vote fraction. Hence, there is no need for a gerrymander as the Republicans have the needed votes to often keep a supermajority under even a typical map.

We will see in Figure 5.1.2 and 5.1.3 below that when these three elections are shifted (using the uniform swing hypothesis) to produce plausible voting fractions at a larger statewide Democratic vote fraction, then the results are also extreme outliers.

It is also worth noting that the bias in the enacted plan from what non-partisan map would produce systematically is the favor of the Republican party. Not once is the tilt even mildly in the favor of the Democrats.

To better control for other variation, we now include a number of Collected Seat Histograms built from a single election which has been shifted to create a sequence of elections with different statewide partisan vote fractions but the same spatial voting patern.

In Figures 5.1.2 and 5.1.3, we see that the same phenomena from Figure 5.1.1 is repeated again and again. As the vote share increases to the point where the primary ensemble for the NC House would typically break the Republicans supermajority, the enacted plan under elects Democrats to an extent which makes it an extreme outlier. This exceptional under-electing of Democrats persists past the point where almost all of the ensemble maps would have given the majority to the Democrats. In many cases the enacted map fails to respond to the shifting will of the electorate, leaving the control in the Republican hands. In addition to presenting these figures, we have also animated this affect with movies that have been submitted.

To better understand the structures responsible at the district level for the extreme outlier behavior seen in Table 2 and Figures5.2.1 to 5.2.2, we now turn to the rank-order-boxplots as described in Section 3.4. It is easy to see the abnormal structures of the enacted plan which are responsible for its extreme outlier behavior. The pattern revealed is one often seen in gerrymandered maps; namely *packing and cracking*. This refers to the depleting of one party from districts which typically would be competitive but often elect a representative from their party and instead place them in districts which were already overwhelmingly safe for either party. In Figures 5.1.4, 5.1.5, and 5.1.6, a version of this pattern is repeated. The number of Democrats seen in the districts which usually would be moderate in their partisan makeup has been decreased with a corresponding increase in the number of Democrats in the more Democratic districts where their presence has little effect on the election outcome. We give the specifics in the captions of each figure. We will see that this type of structure will be repeated in many of the individual clusters which are analyzed in Section 6.1. In addition to presenting these figures, we have also animated this affect with movies that have been submitted.

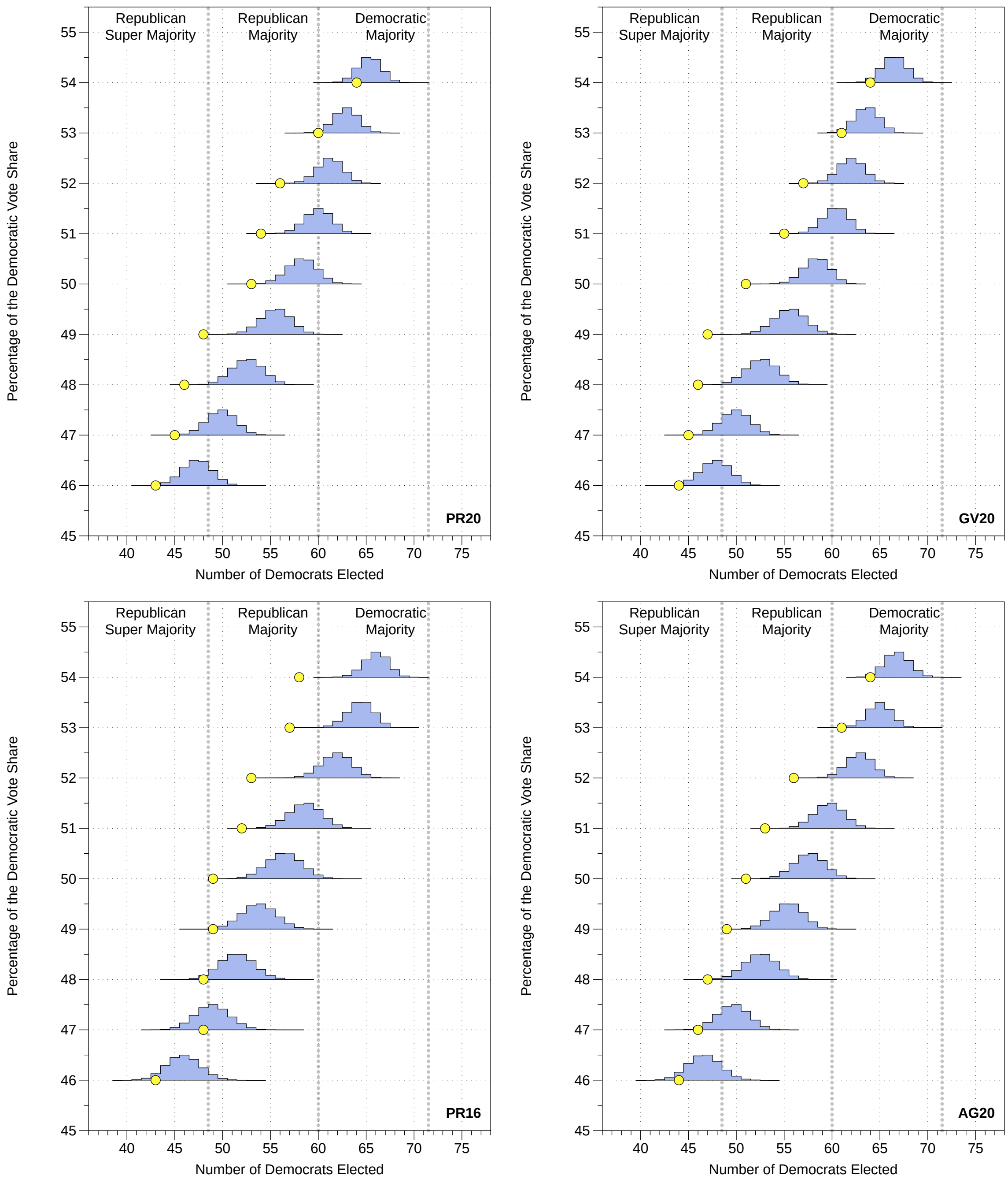


Figure 5.1.2: The individual histograms give the frequency of the Democratic seat count in the ensemble for each of the shown statewide elections, with a uniform swing. The histograms are organized vertically based on the statewide partisan vote fraction. The more Republican swings are placed lower on the plot while more Democratic swings are placed higher. Three dotted lines denote the boundary between where the supermajorities and simple majorities are in force. The yellow dot is the enacted plan.

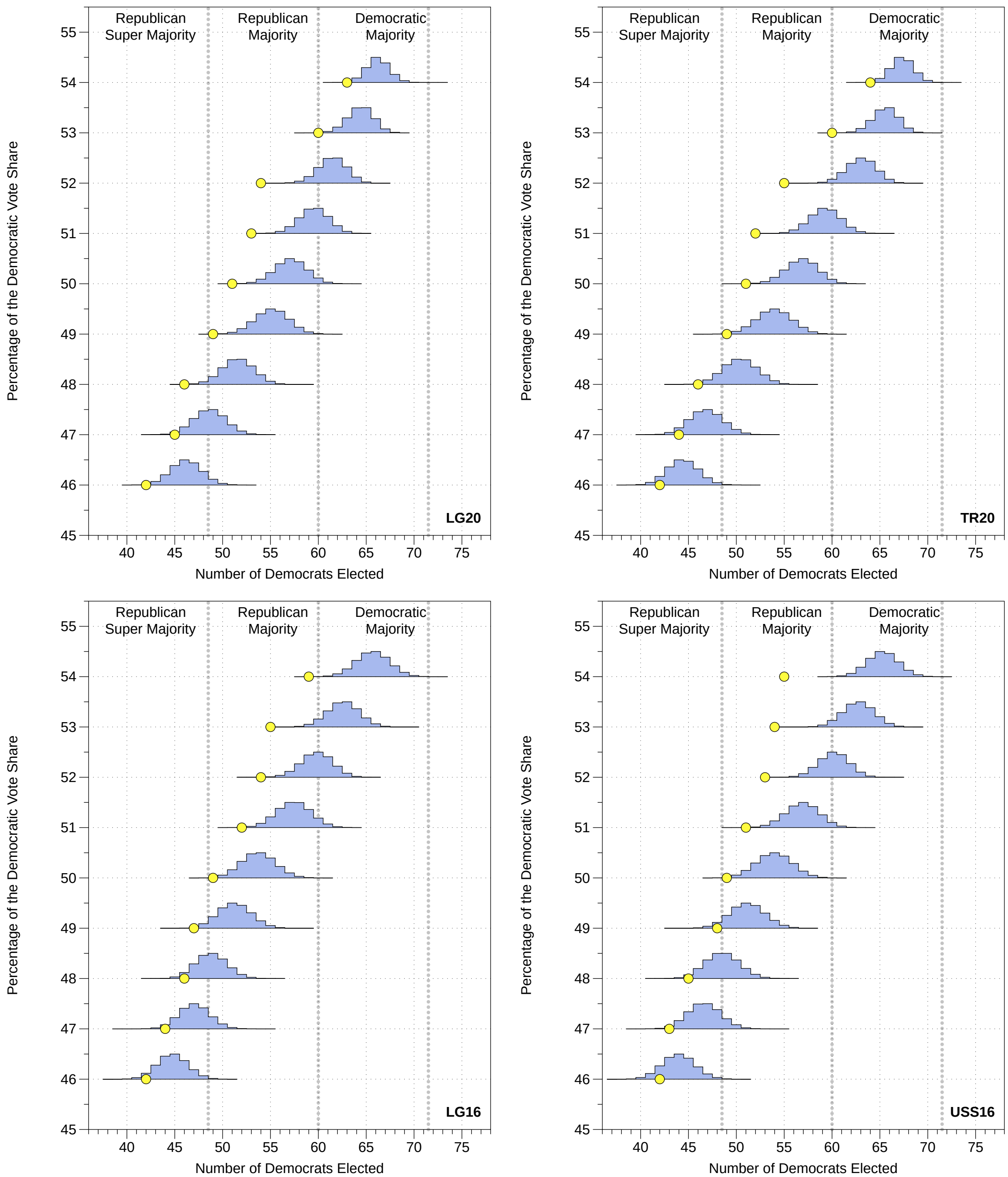


Figure 5.1.3: The individual histograms give the frequency of the Democratic seat count in the ensemble for each of the shown statewide elections, with a uniform swing. The histograms are organized vertically based on the statewide partisan vote fraction. The more Republican swings are placed lower on the plot while more Democratic swings are placed higher. Three dotted lines denote the boundary between where the supermajorities and simple majorities are in force. The yellow dot is the enacted plan.

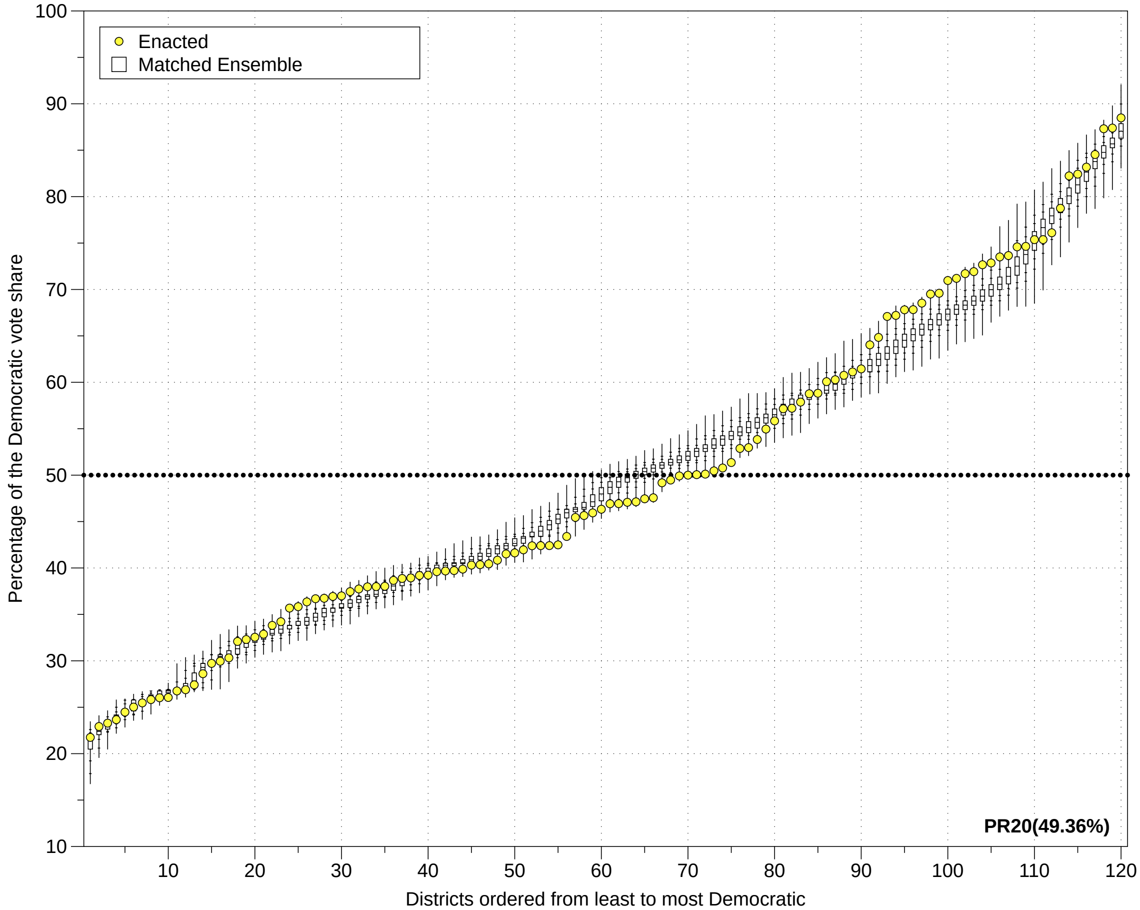


Figure 5.1.4: The yellow dots represent the democratic vote fraction of the enacted map under the PR20 vote count when the district are ordered from most Republican on the left to most Democratic in vote share on the right. The box-plots show the range of the same statistic plotted over the primary ensemble. From around the 60th to 80th district the yellow dots all well below the boxplots of the ensemble. This result is that many dots fall well below the dotted 50% line than usually would; and hence more Republicans are elected than typical. To achieve this effect, the fraction of Democrats is increased in the already strongly democratic districts ranging from the 90th to 105th most Democratic districts. This structure does not exist in the non-partisan ensemble and is responsible for the map's extreme outlier behavior.

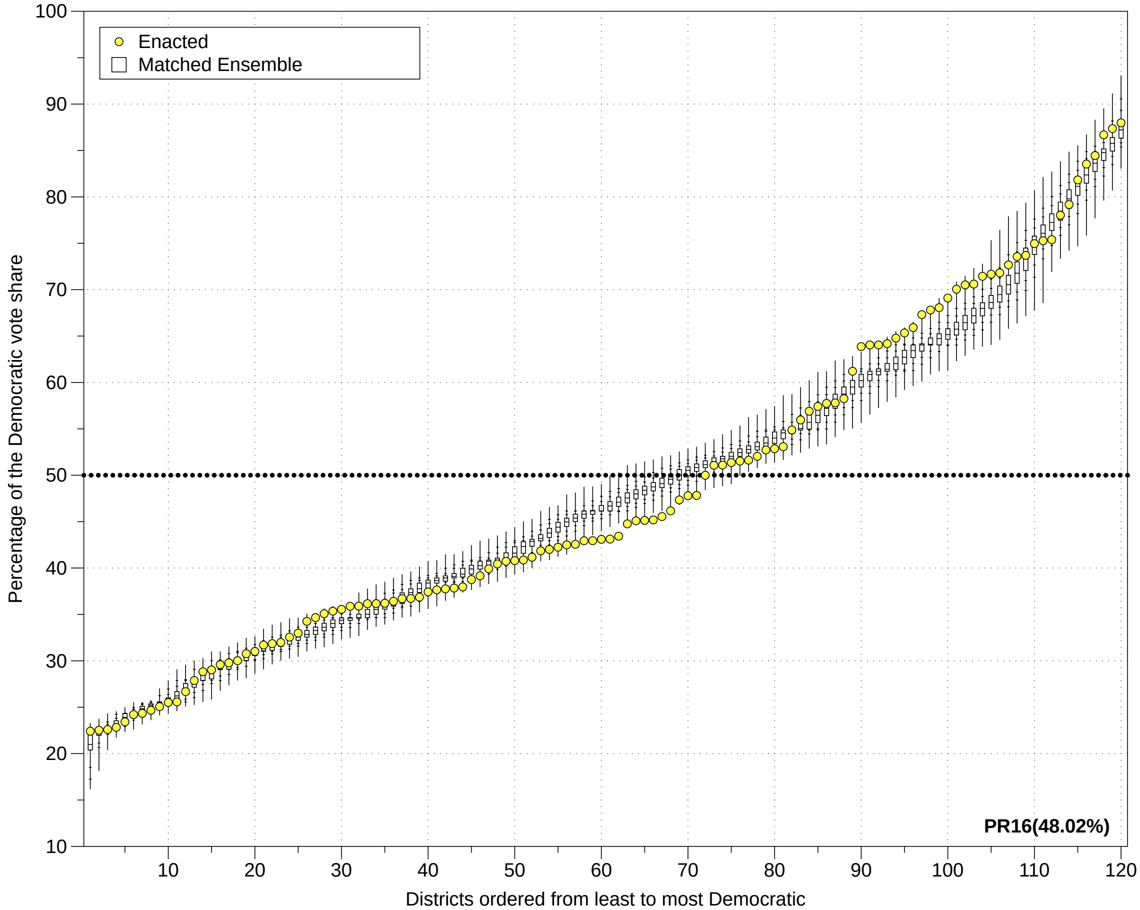


Figure 5.1.5: A similar structure to that seen in Figure 5.1.4 is repeated here. The low 50s to the high 70s have had the number of democrats depleted while the districts from the high80s to around 105 have an excess of Democrats.

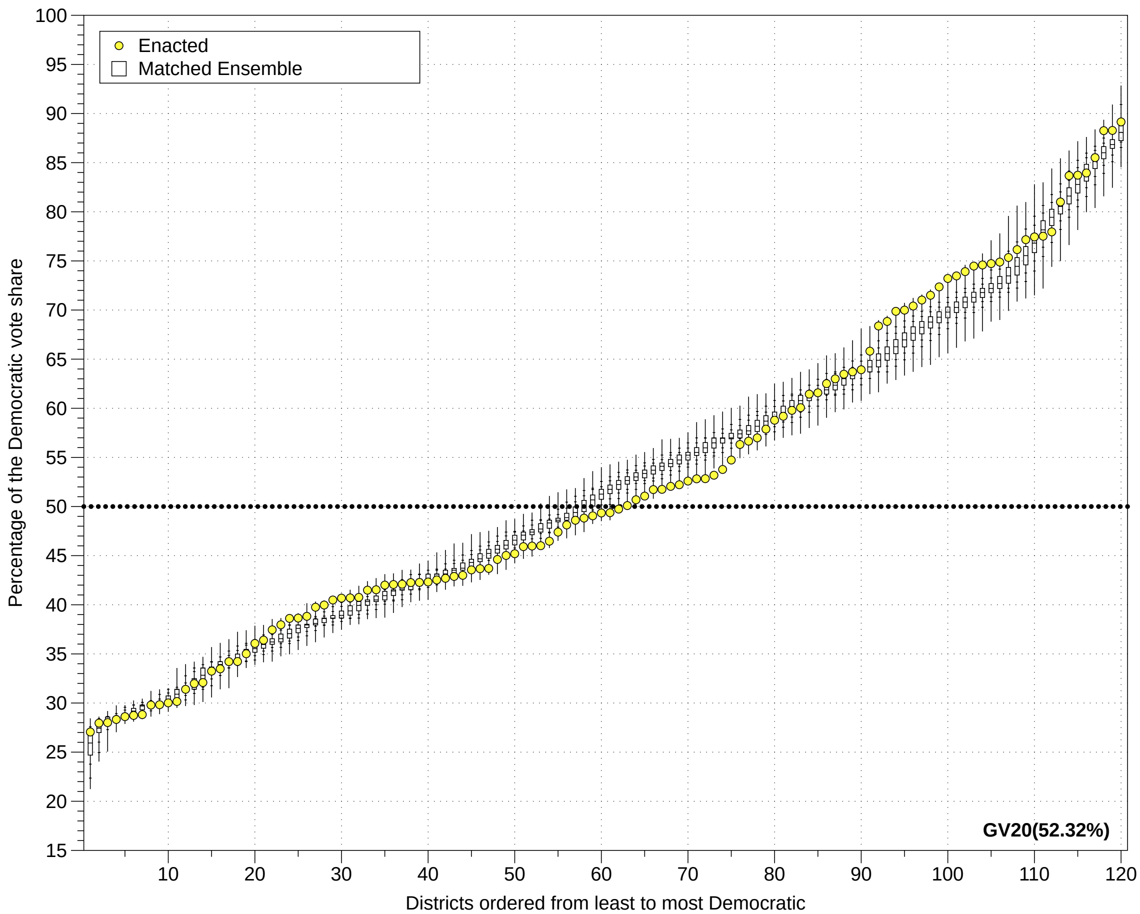


Figure 5.1.6: Mirroring what was seen in Figure 5.1.4 and Figure 5.1.5, we have abnormally few Democrats from around the 60th to the 80th most Republican and abnormally many Democrats packed in the districts in the low 90s to the just below 110.

NC House: Primary Ensemble considering Incumbency.

Figure 5.1.7 shows the Collected Seat Histogram analogous to Figure 5.1.1, but for an ensemble which pairs the same or fewer incumbents than the enacted plan. The other considerations are left unchanged from the Primary ensemble. Comparing the two figures, we see no qualitative change in the behavior of the ensemble. Hence the previous conclusions continue to hold. In particular, a desire to prevent the pairing of incumbents cannot explain the extreme outlier behavior of the enacted plan.

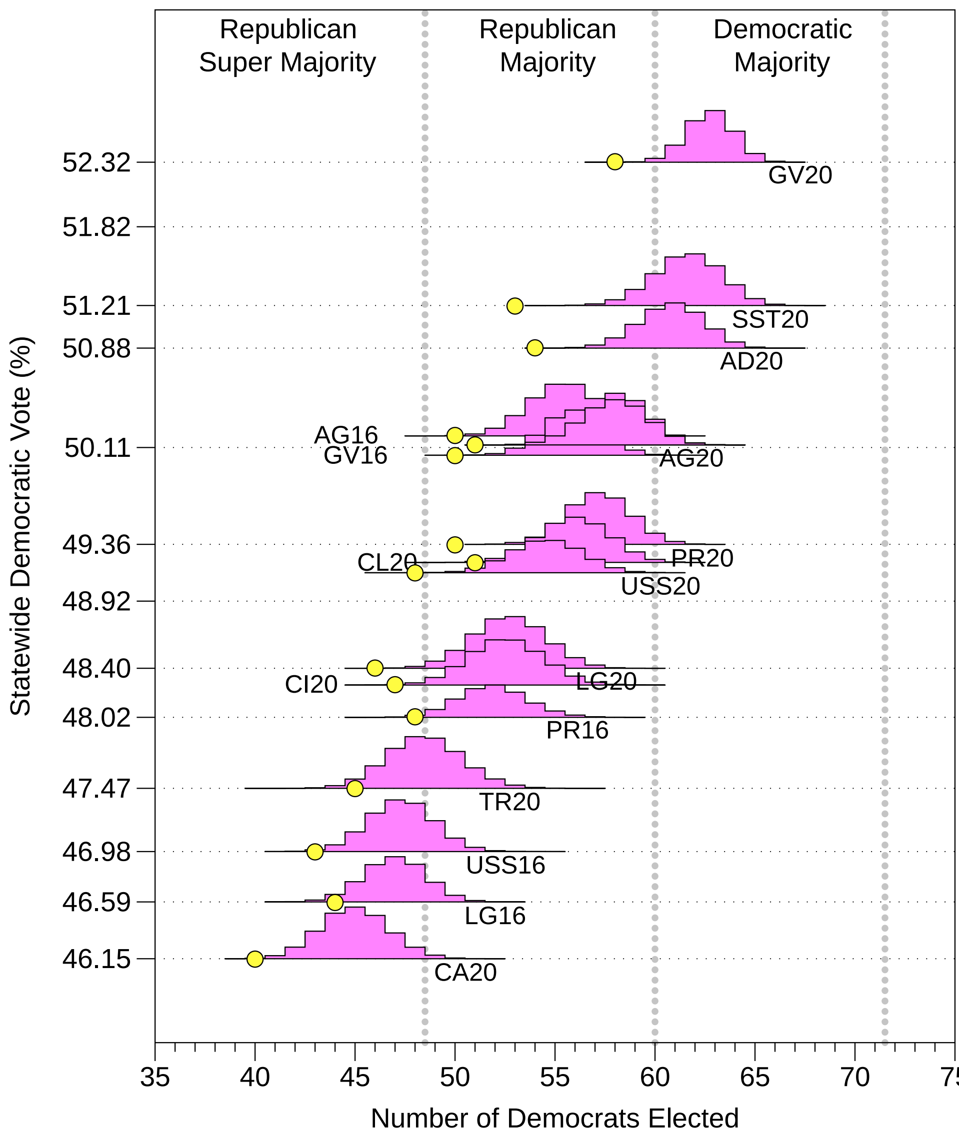


Figure 5.1.7: The Collected Seat Histogram for the Primary Ensemble on the NC House with incumbency considerations added. See Figure 5.1.1 for full description.

NC House: Secondary Distribution

The ensemble used to produce Figure 5.1.8, put more weight on preserving municipalities than either the enacted plan or the Primary Ensemble, which is tuned to match the enacted plan. This enacted plan is still an extreme outlier with respect to this secondary ensemble. We still see that the enacted map resists relinquishing the supermajority under PR16, CI20 and LG20 when this secondary ensemble almost always does. Similarly as the elections become more Democratic in AD20, SST20 and GV20 and the ensemble regularly would give the majority to the Democrats the enacted map dramatically under elects Democrats. In other words, we find that if the mapmakers had made an effort to prioritize preservation of municipalities in the House, that effort would not have led to a map that was more likely to favor Republicans.

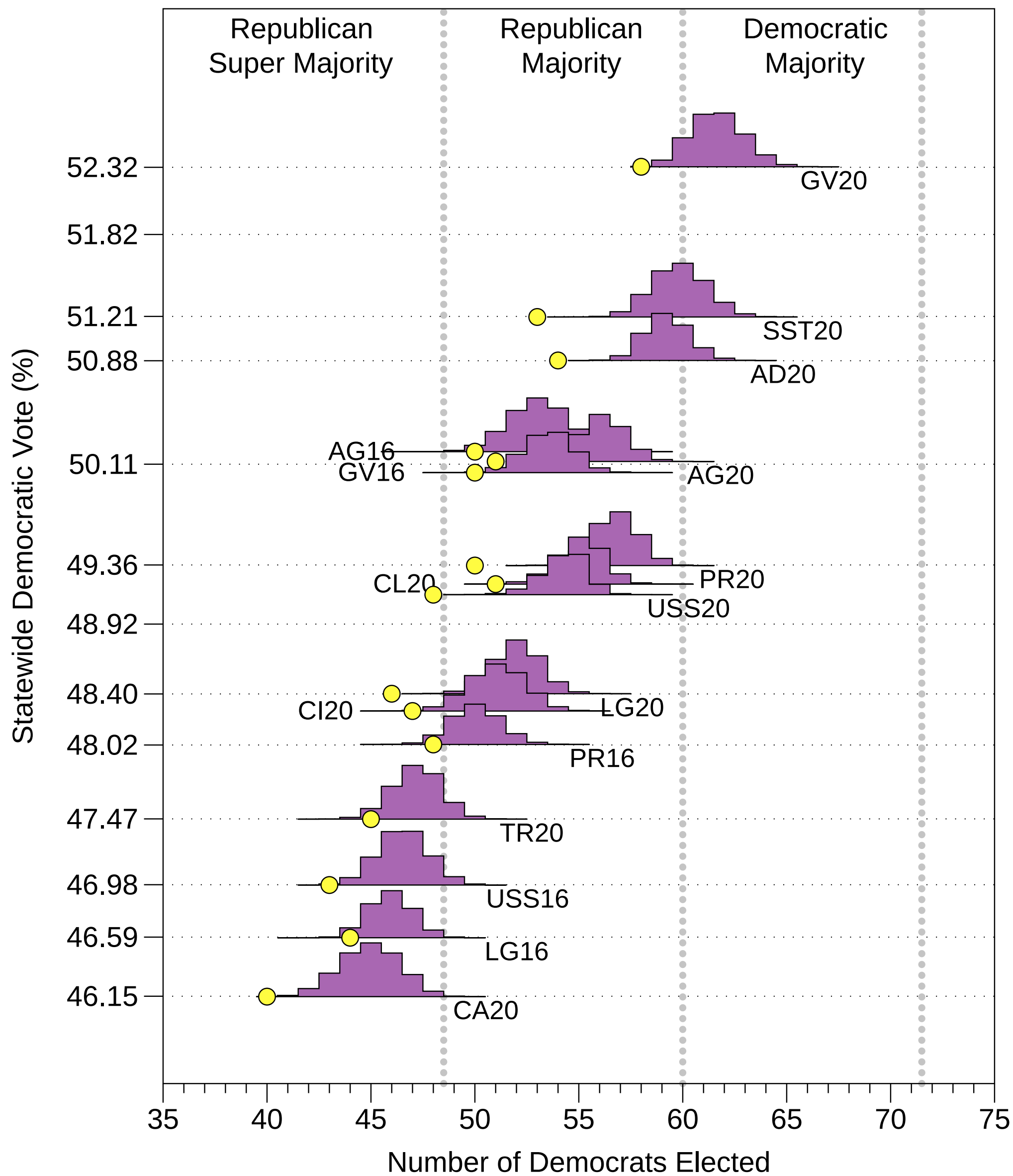


Figure 5.1.8: The Collected Seat Histogram for the Secondary Ensemble on the NC House. The Secondary Ensemble for the NC House is centered on distributions which better preserve municipalities than the enacted plan. See Figure 5.1.1 for full description.

% Dem	Election	% Outlier	# Outlier	# Samples
52.32%	GV20	16.343%	16343	100000
51.21%	SST20	35.184%	35184	100000
50.88%	AD20	42.880%	42880	100000
50.20%	AG16	12.129%	12129	100000
50.13%	AG20	4.332%	4332	100000
50.05%	GV16	0.075%	75	100000
49.36%	PR20	6.220%	6220	100000
49.22%	CL20	5.365%	5365	100000
49.14%	USS20	14.052%	14052	100000
48.40%	LG20	0.000%	0	100000
48.27%	CI20	0.322%	322	100000
47.47%	TR20	5.726%	5726	100000
46.98%	USS16	43.176%	43176	100000
46.59%	LG16	44.943%	44943	100000
46.15%	CA20	1.123%	1123	100000

Table 2: NC Senate Collected Seat Histogram Outlier Data. Starting from the left, the first column gives the statewide partisan makeup of the election under consideration whose abbreviation is given in the second column from the left. The right most column gives the total number of plans in the ensemble considered which is 100,000. The second column from the right gives the number of those 100,000 plans which elect the same or less Democrats under the given election. These are the plans which are as much or more of an outlier than the enacted map. The middle column is the percentage of plans which are more or equal of an outlier. (It is calculated by dividing the 2nd column from the right by 100,000 and multiplying by 100 to make a percentage.) The number of fairly small to extremely small percentage in the middle column between 50.13% (AG20) and 47.47% (TR20) are another signature of the anomalous behavior seen visually in Figure 5.2.1 over the same range of vote percentages.

5.2 NC State Senate

We will see in our cluster-by-cluster analysis that the NC Senate map has a number of clusters that are outliers. Their structures are systematically in favor of the Republican party. As discussed in Section 3.2, we often see maps that express their outlier status under a specific voting climate; often when one party is in danger of losing the majority or super-majority. The enacted map for the NC Senate shows this behavior.

Figure 5.2.1 is the plot for the NC Senate analogous to Figure 5.1.1, which was for the NC House. Most of the outlier behavior at the state level for the enacted NC Senate map is concentrated in the interval between 47.5% statewide Democratic vote share and around 50.5% statewide Democratic vote share. In this range, the enacted map is always an outlier and often an extreme outlier under the votes considered. This range is significant for a number of reasons. First, this is a range of statewide vote fraction where many North Carolina elections occur. Secondly, looking at Figure 5.2.1 we see that over this range the ensemble shows that one should expect the Republican super-majority (less than 21 Democratic Seats) to switch to a simple Republican majority (between 21 and 24 Democratic Seats). Yet the enacted map often resists this switch, breaking the supermajority only when the PR20 and CL20 votes are considered. In both of these elections, the ensemble places the typical number of Democratic seats well away from the supermajority line and centered between it and the simple majority line.

To make Figure 5.2.1 more quantitative, we have included Table 2 which shows the number of maps where the primary ensemble elects less democrates in that election than the enacted map.

Looking at Table 2 we see that a number of the elections in the critical partisan range of around 47.5% to 50% are extreme outliers (GV16, LG20, and CI20) while other (AG20, PR20, and TR20) show atypical behavior all favoring the Republican candidates. It is again important to notice that the enacted plan is never seen to favor the Democratic party relative to what is expected from the Primary non-partisan ensemble. The enacted map ranges between tilted to the Republican party to being an extreme partisan outlier. The importance of the range of statewide Democratic between 47.5% to 50% by looking at Figure 5.2.1. The primary ensemble shows that is within this range that one expects a Republican supermajority to become a simple majority. The effect of the enacted plan is to suppress this by under electing Democrats.

We will in the cluster-by-cluster analysis in Section 6.2 that a number of individual clusters are extreme outliers in their partisan structure.

To better control for other variation we now include a number of Collected Seat Histograms built from a single election which has been shifted to create a sequence of elections with different statewide partisan vote fractions but the same spatial voting pattern.

The large jump that we see in Figures 5.2.3 to 5.2.5 between the 33nd most Republican district and the 35th most

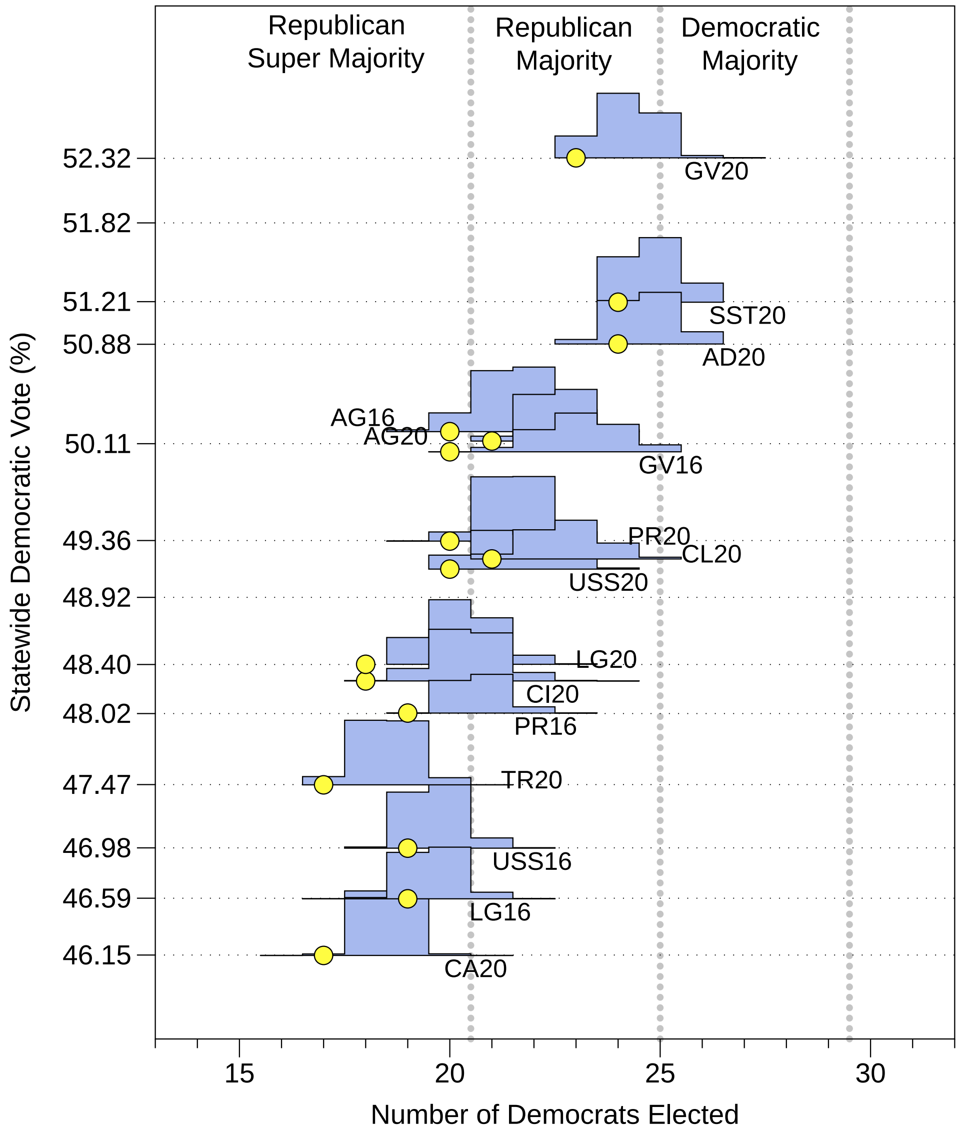


Figure 5.2.1: The Collected Seat Histogram for the Primary Ensemble on the NC Senate. The individual histograms give the frequency of the Democratic seat count for each of the statewide elections considered from the years 2016 and 2020. The histograms are organized vertically based on the statewide partisan vote fraction for each election. The more Republican elections are placed lower on the plot while more Democratic elections are placed higher. Three dotted lines denote the boundary between where the supermajorities and simple majorities are in force.

Republican district means that over a large range of swings in the partisan character of the election the outcome will change at most by one seat.

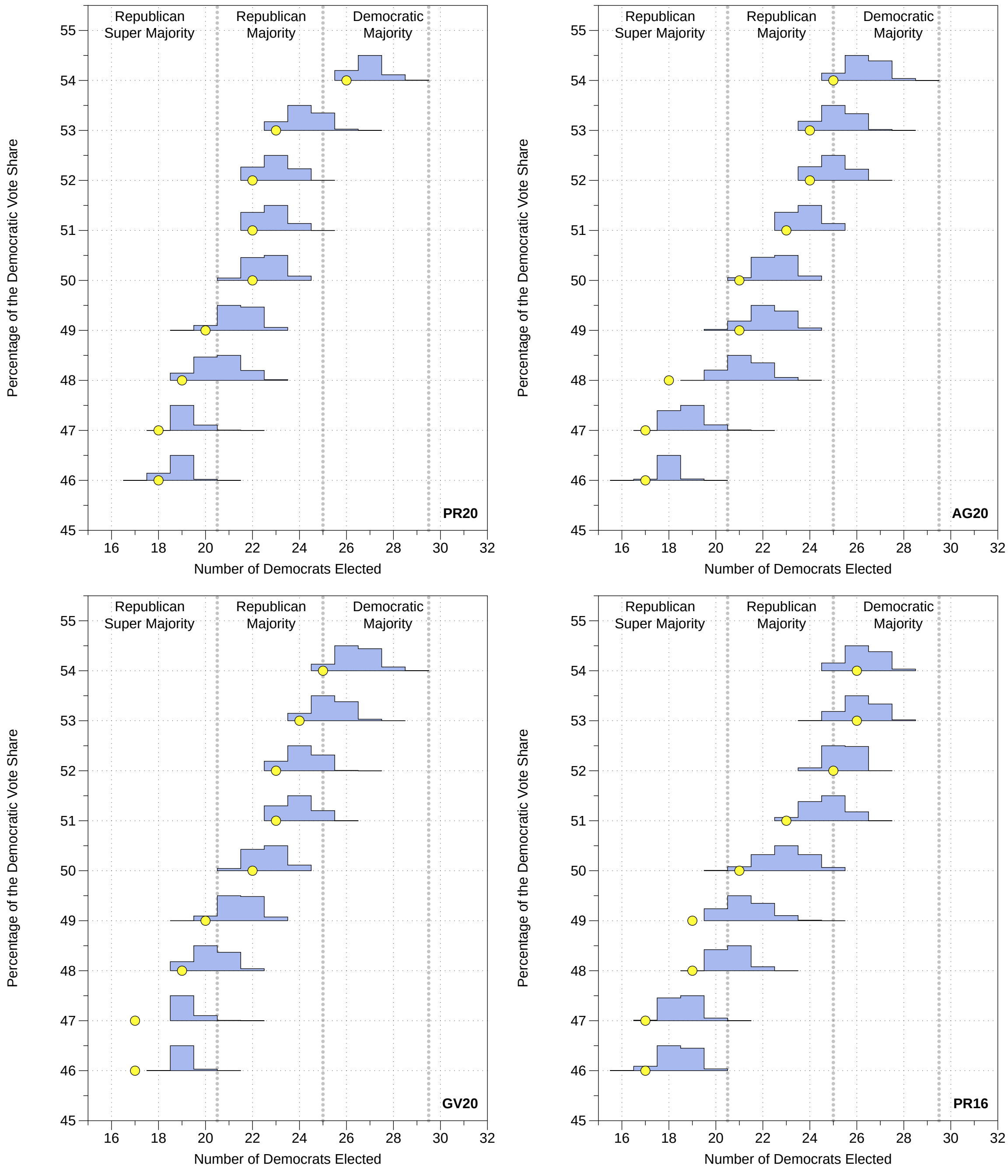


Figure 5.2.2: The Collected Seat Histograms for the Primary Ensemble on the NC House built from a collection of voting data generated via uniform swing.

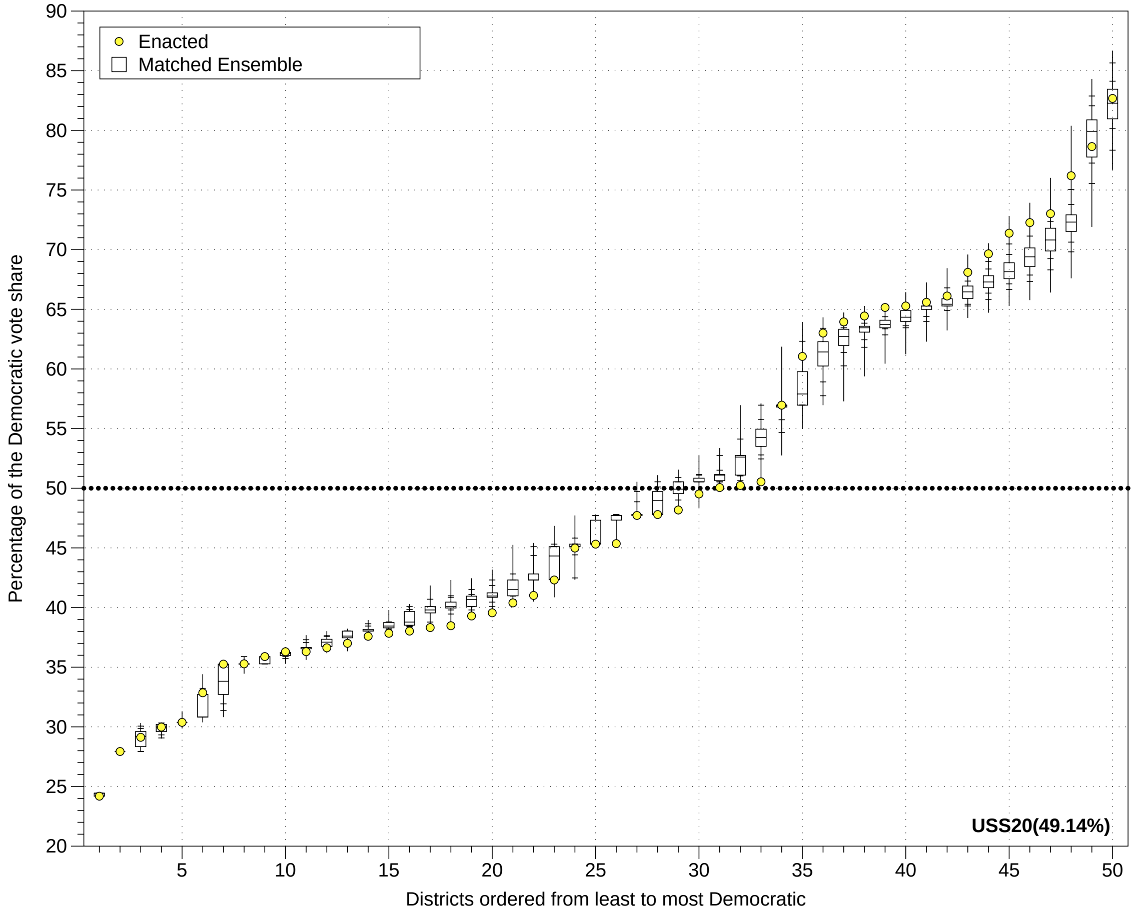


Figure 5.2.3: The yellow dots represent the democratic vote fraction of the enacted map under the USS20 vote count when the district are ordered from most Republican on the left to most Democratic in vote share on the right. The box-plots show the range of the same statistic plotted over the primary ensemble. Essentially all of the districts between the 15th most Republican and the 33rd most Republican have abnormally few Democrats. This is compensated by packing abnormally many Democrats the 35th to the 47th most Republican districts. This structure is an extreme outlier and does not occur in the ensemble.

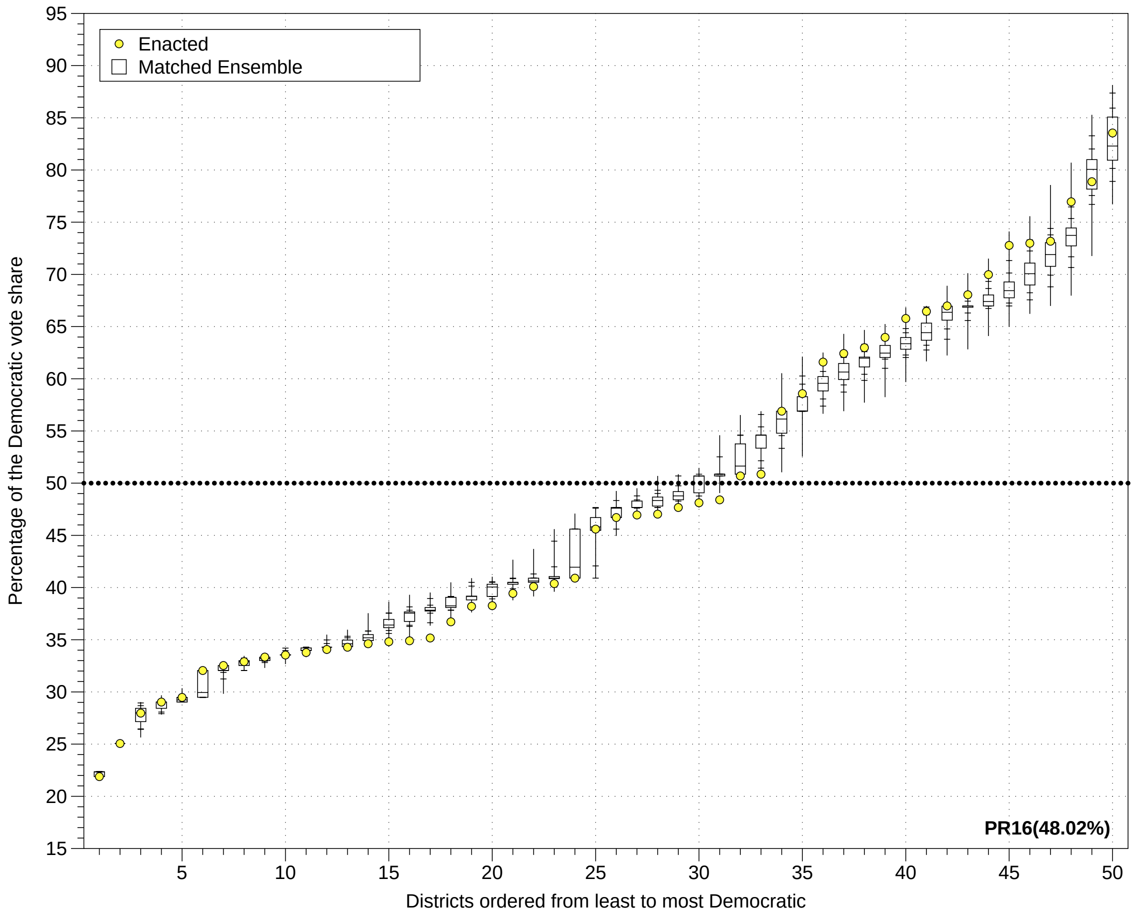


Figure 5.2.4: A similar structure to that seen in Figure 5.2.3 is repeated here over a nearly identical range of districts.

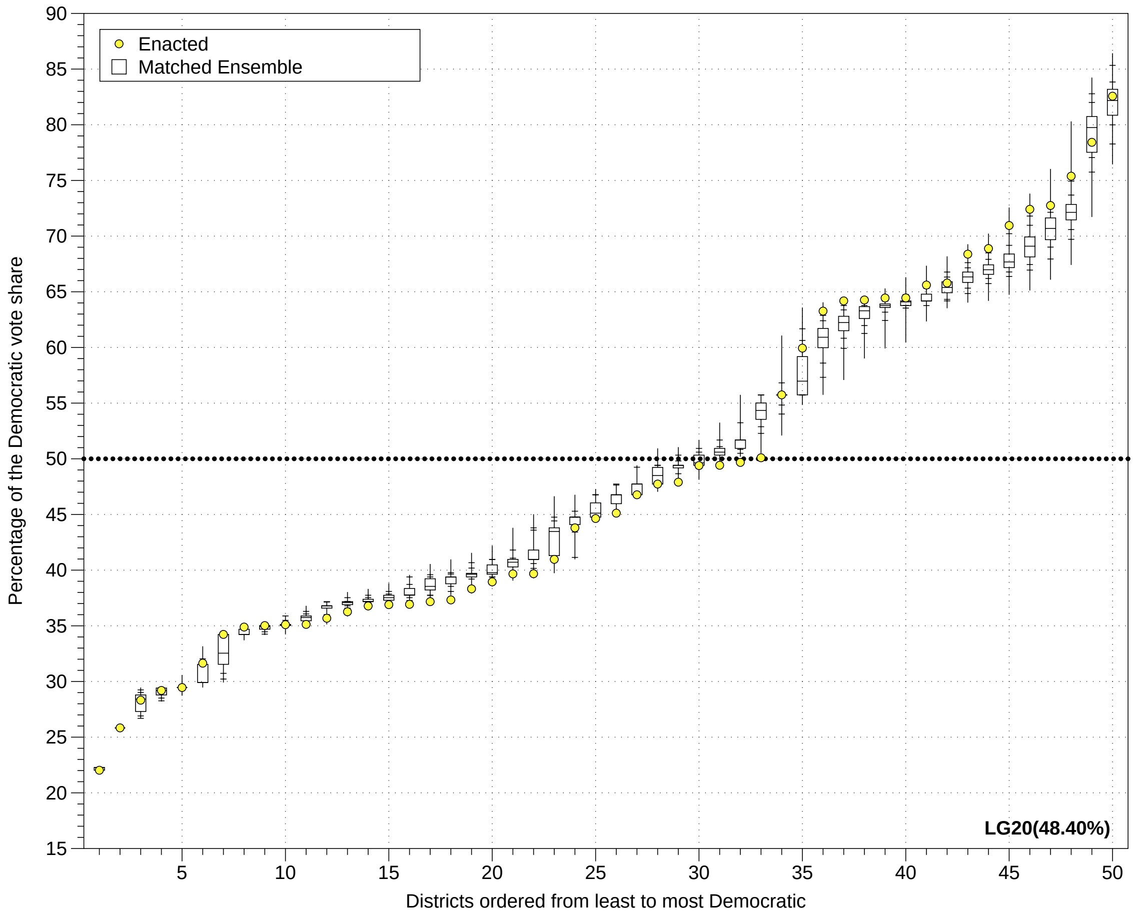


Figure 5.2.5: A similar structure to that seen in Figure 5.2.3 is repeated here.

NC Senate: Primary Ensemble considering Incumbency.

Preserving incumbency has little qualitative effect on the observations we have made. Looking at 5.2.6, we see that the election between and including GV16 and TR20 in the Figure 5.2.6 are all extreme outliers. This is in fact more extreme that the enacted map was under the Primary ensemble. It reinforces that this gerrymander seems to be most efective at the statewide level when the Republican supermajority is possible but in question.

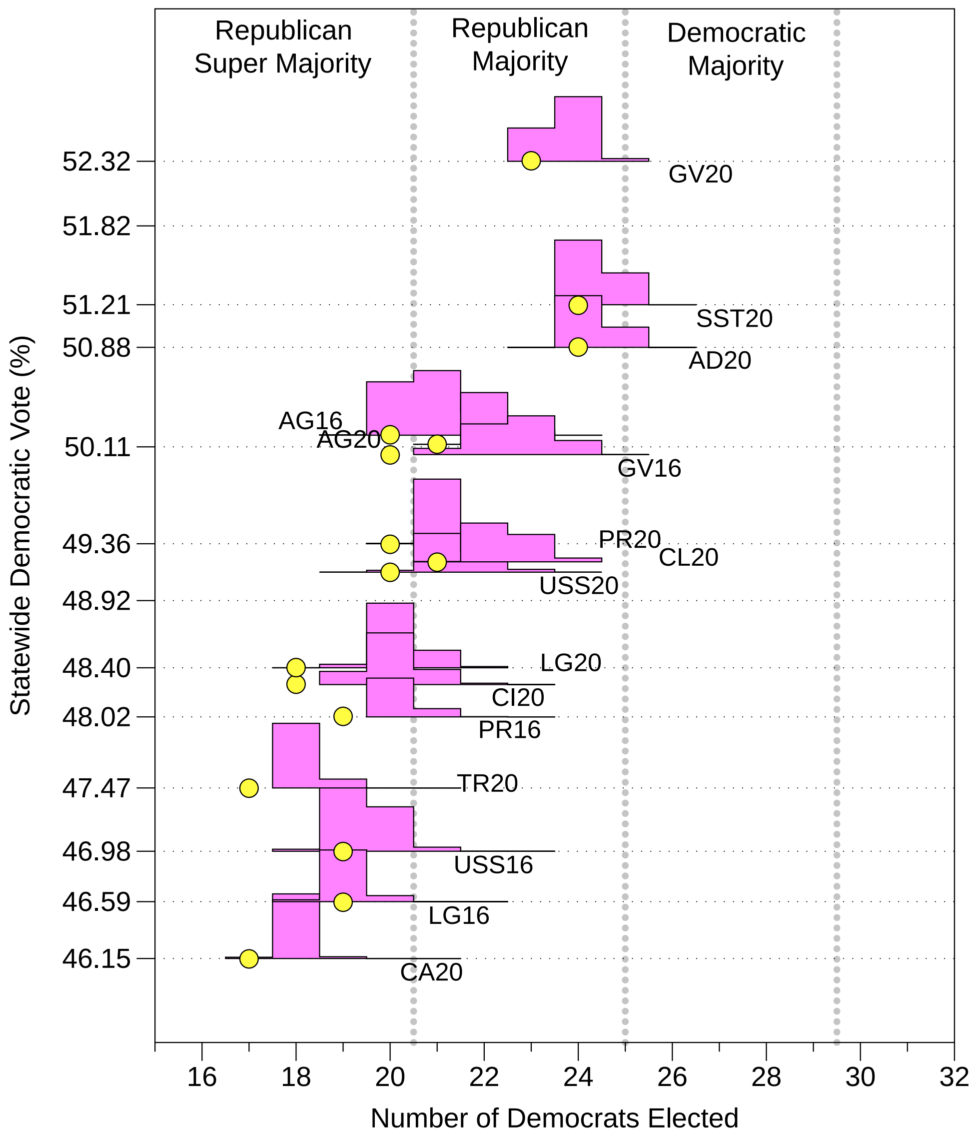


Figure 5.2.6: The Collected Seat Histogram for the Primary Ensemble on the NC Senate with incumbency considerations added. See Figure 5.1.1 for full description.

NC Senate: Secondary Distribution

When municipal preservation is not prioritized, the enacted plan becomes an outlier in all but the two most Republican elections as shown in Figure 5.2.7. Additionally, in most cases it was an extreme outlier when municipal preservation is not considered.

In other words, when municipal preservation is not prioritized, the ensemble produced is more favorable to the Democrats, meaning that the enacted plan appears as an extreme outlier in more situations than in the ensemble that matched the enacted map in prioritizing municipality. Put differently, the decision to prioritize municipality preservation in the Senate plan appears to have enabled more maps that favor Republicans.

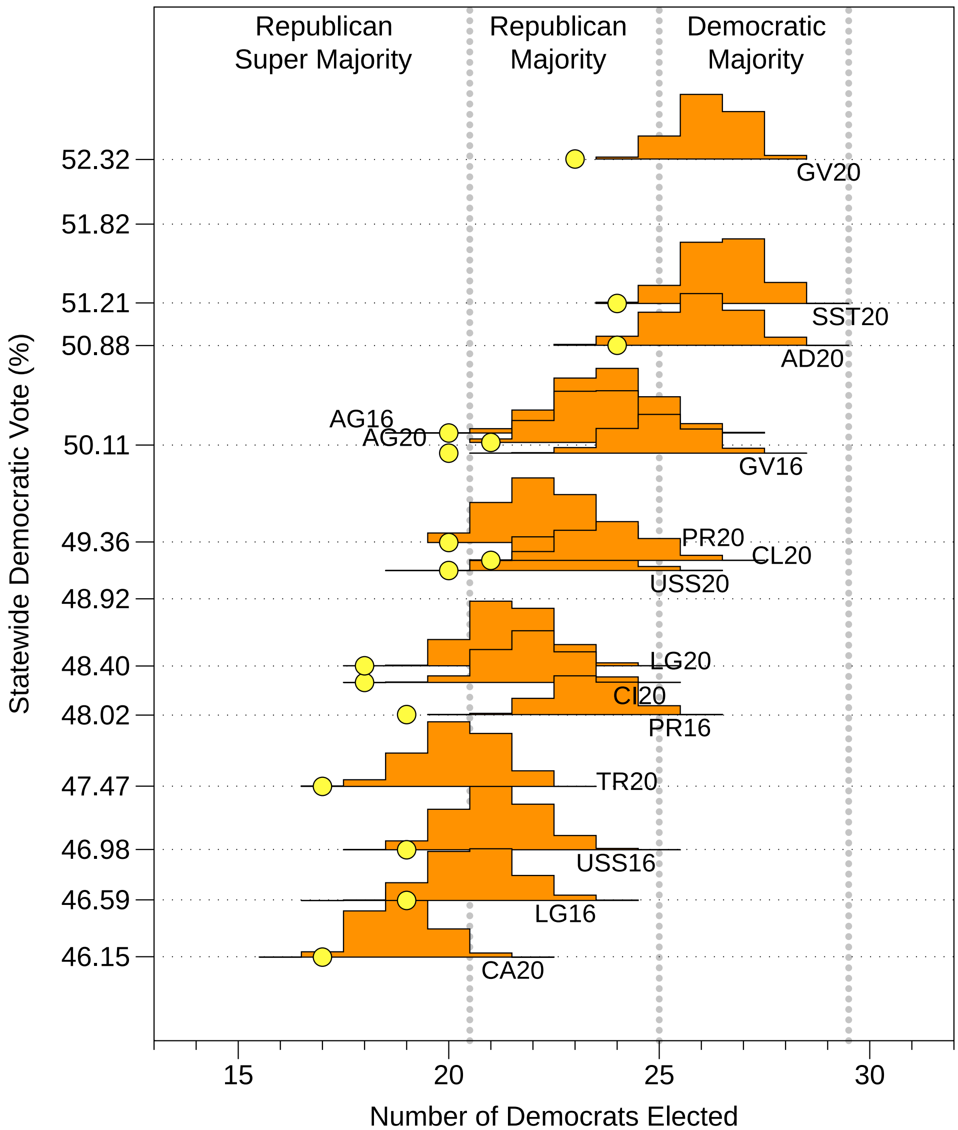


Figure 5.2.7: The Collected Seat Histogram for the Secondary Ensemble on the NC Senate. The Secondary Ensemble for the NC Senate is centered on distributions which do not explicitly consider municipality preservation. See Figure 5.1.1 for full description.

6 State Legislature: Selected Cluster by Cluster Analysis

Using the same tools, we now turn our analysis to the individual cluster. We find that a number of cluster demonstrate significate cracking and packing. In some cases this leads to changes in the partisan make of the representative typically elected from the region. In other cases, it makes the districts insensitive to changes in the voters political outlook as expressed in their votes.

6.1 NC State House

6.1.1 Mecklenburg

The ranked ordered histogram for the Mecklenburg cluster using the primary ensemble (which matches the number of people displaced from municipalities) is given in Figure 6.1.1. Across all of the voting patterns considered, we see that the two most Republican Districts (districts 98 and 103) have exceptionally few Democrats. This has the effect of making them more likely to elect a Republican when many (and often almost all) ensemble plans elect a Democrat in those districts. Specifically, that is the case under LG20, AG20, USS20, CL20, AD20 and SST20. Under GV20 and PR20, the two most Republican districts barely elect Democrats even though the majority of the ensemble plans safely elect Democrats. Under CA20 and TR20, the enacted plan safely elects two Republicans while under the ensemble the races are much closer, swinging in both directions under different plans. In these two elections, the enacted map elects a third Republican (in District 104) when the ensemble of maps typically would not. All of this is achieved by packing exceptionally many Democrats into the 6th through 9th most Democrat district, as shown in Figure 6.1.1 where the enacted plan is consistently at the extreme top of the range seen in the ensemble. All of these facts make the plan an extreme outlier in this cluster.

In fact, ranging over all of the elections considered, the Democratic fraction in the four most republican districts in the ensemble is greater than that in the enacted plan in less than 1.7% of the plans with it dipping as low as around 0.5% in a few cases. More dramatically, the percentage of plans in the ensemble where the fraction of Democrats, in the four most Democratic districts, is always less than 0.11% with it often dipping as low as 0.02% or lower.

As already discussed, it was possible to oust many less people from municipalities than the enacted plan does. Figure 6.1.2 shows the secondary ensemble which constrains municipalities much more strongly. We seen that structures highlighted above persist in this ensemble; again making the enacted map an extreme outlier.

Municipal Splits and Ousted Population: In Figure 6.1.3, we see that the enacted plan ousts people from municipalities at a number that is comparable to the primary ensemble but typically more than the Secondary House ensemble.

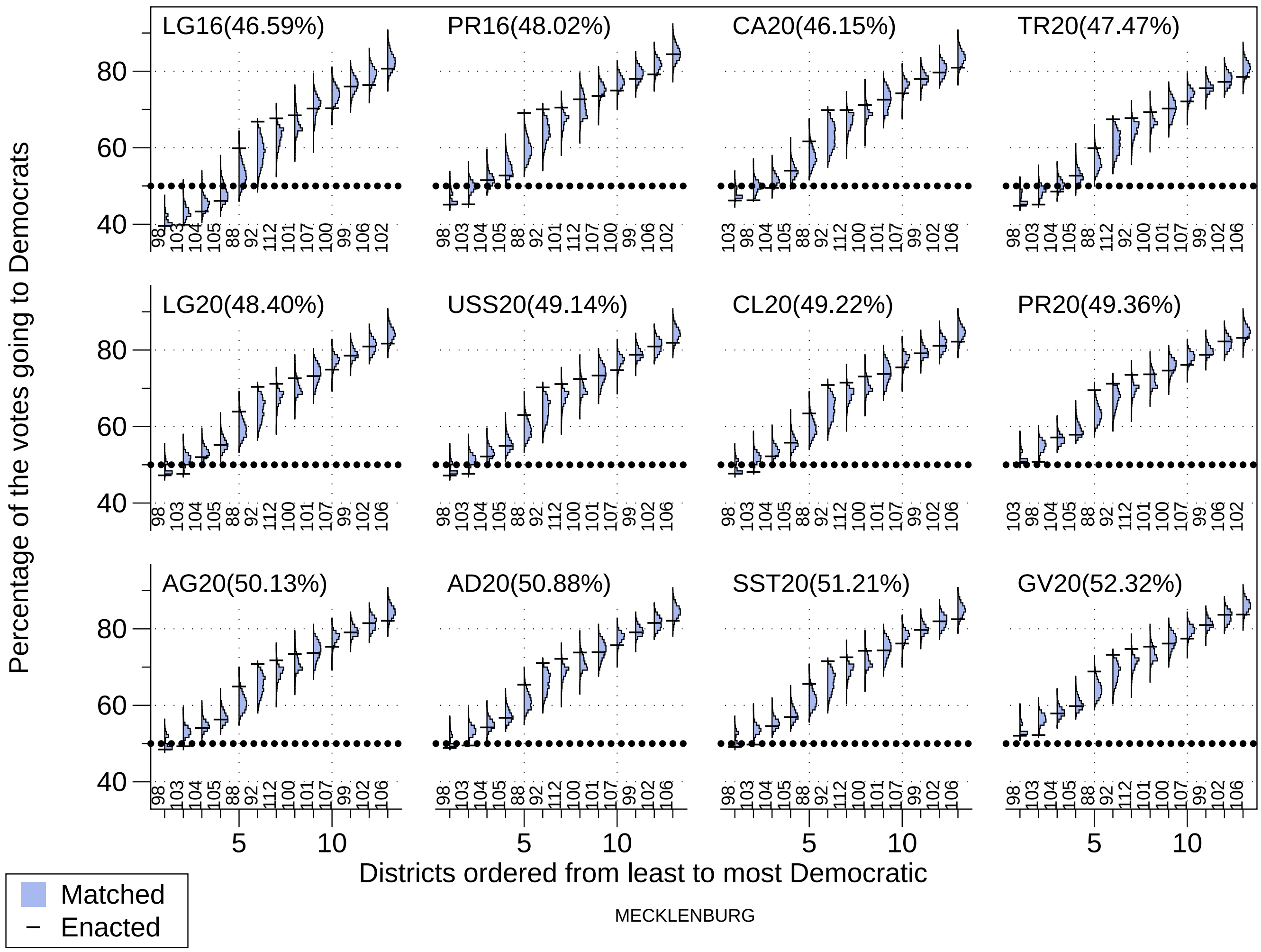


Figure 6.1.1: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

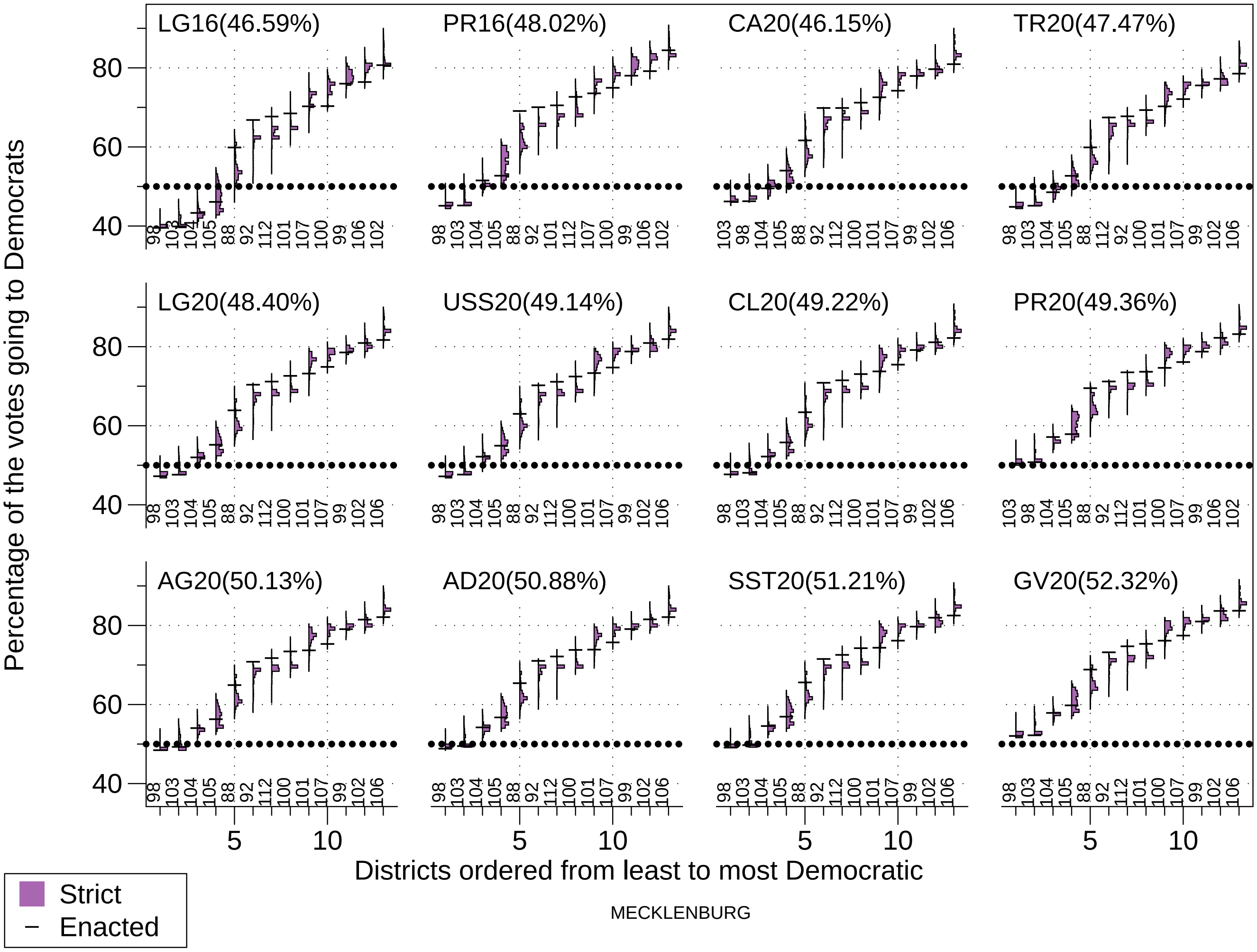


Figure 6.1.2: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The “ – ” on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the “ – ”. This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

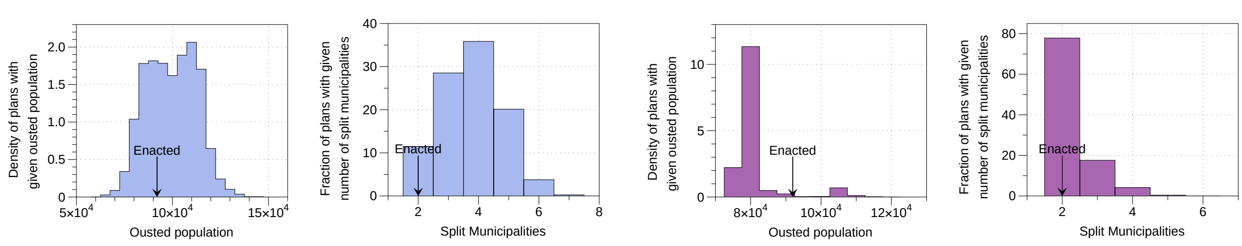


Figure 6.1.3: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.2 Wake

In the Wake cluster, we again see the depleting of Democrats from the two most Republican districts (Districts 37 and 35) while packing Democrats into the next several districts, as in the Mecklenburg cluster. The effect is to swing the two most Republican districts into play in elections where they would not be under the ensemble. Furthermore, the enacted plan makes them safer for Republicans in situations when the ensemble maps would typically have it as a toss-up.

Across all of the elections considered, the number of maps in the ensemble which have a lower Democratic vote fraction in the two most Republican districts than in the enacted plan is less than 0.42% except for the CA20 election where it is 1.2%.

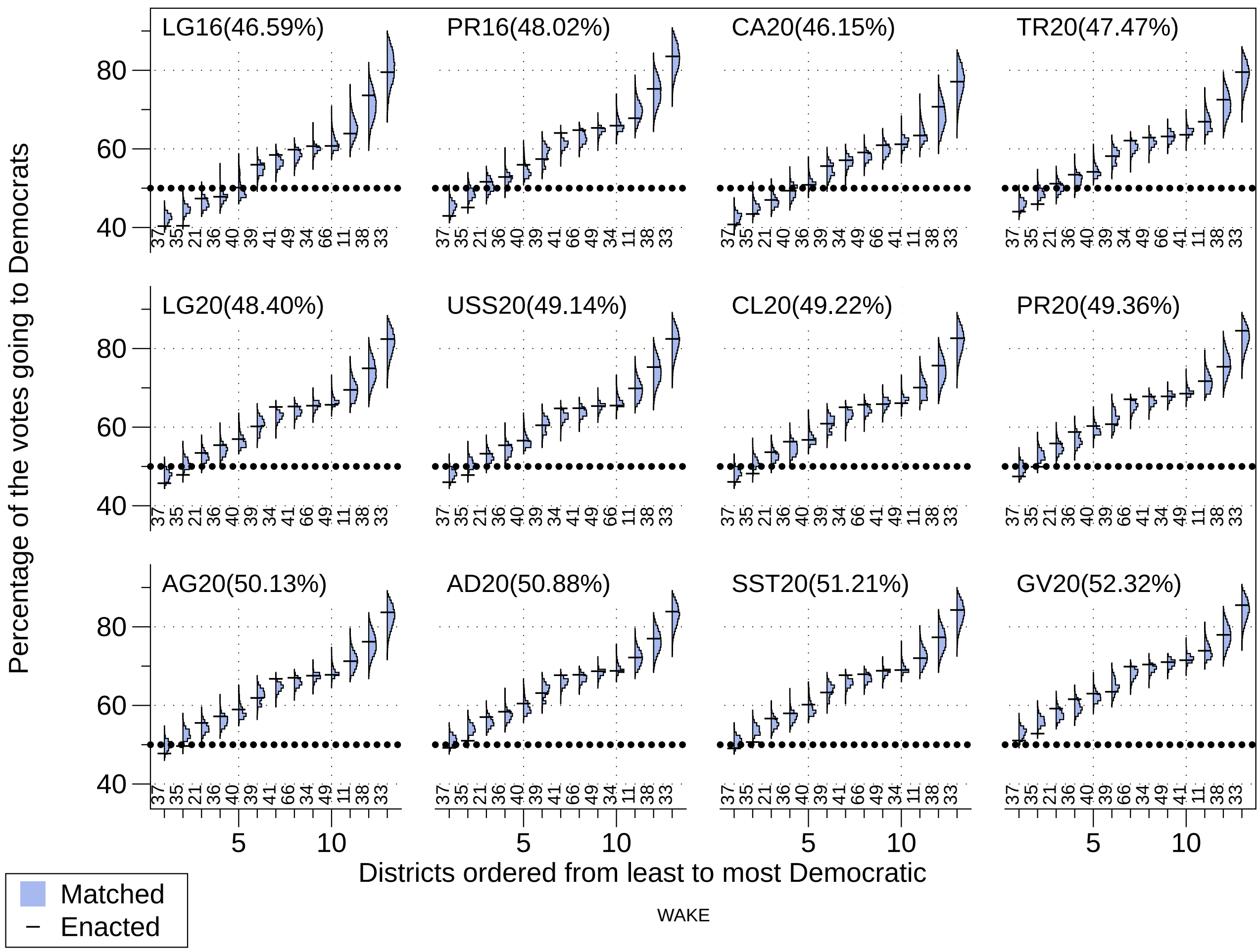


Figure 6.1.4: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

As shown in Figure 6.1.5, the trend continues under the secondary ensemble which better preserves municipalities.

Municipal Splits and Ousted Population:

In Wake we see from Figure 6.1.6 that the enacted plan consistently ousts more people than the primary ensemble and significantly more than the secondary ensemble.

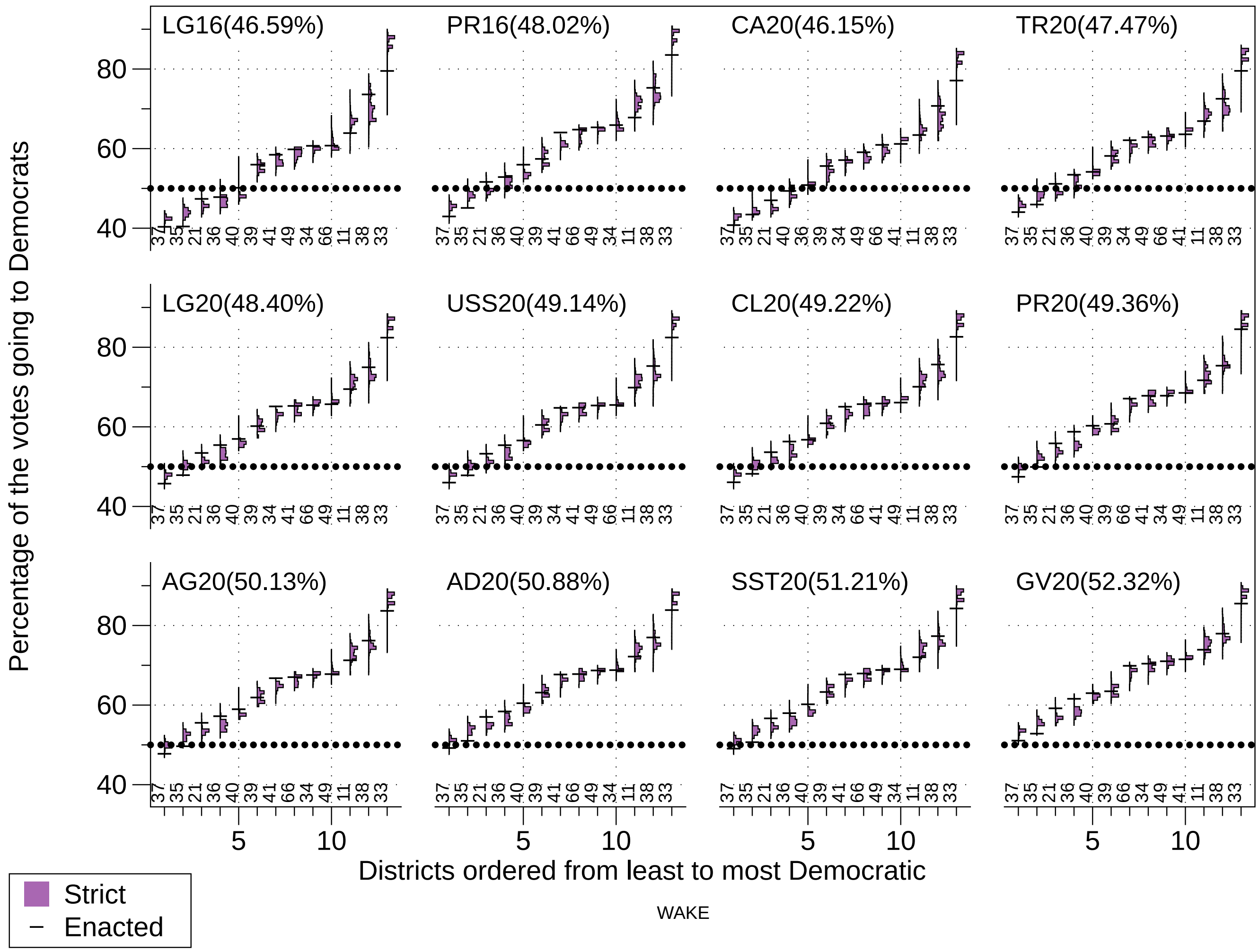


Figure 6.1.5: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

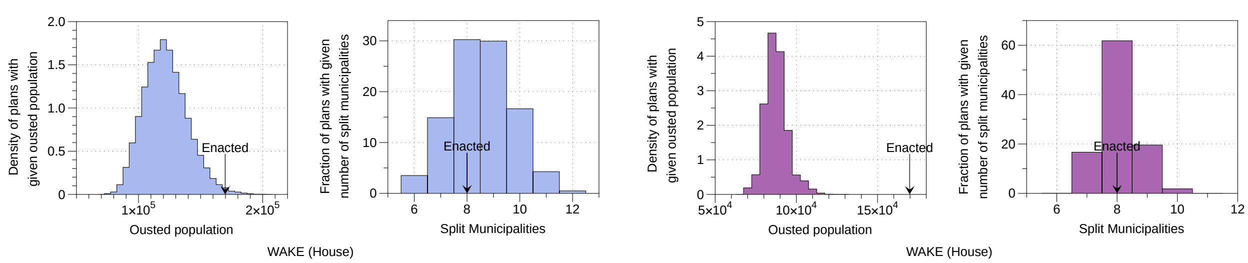


Figure 6.1.6: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.3 Forsyth-Stokes

Again in Figure 6.1.7, showing the primary ensemble in the Forsyth-Stokes cluster, we see the most Republican districts depleted of Democrats while excess Democrats are packed in safe democratic districts and in the safest Republican district are moved to competitive districts. The effect is apparent in all of the elections, but varies slightly across different voting patterns. In all cases, we see the Democratic makeup of the 3rd most Republican district pulled below the range typically seen in the ensemble often resulting in this district electing a Republican when it would not typically. In the three elections where the 3rd-most Republican district still elects a Democrat (GV20), the map's depletion of Democrats from the second most Republican district is enough to reliably elect a Republican in that district when typically the election would vary between being close and strongly favoring the Democrats.

Ranging over all of the elections considered, less than 0.02% of the plans in the ensemble have a lower Democratic fraction in the three most Republican districts than the enacted plan signaling extreme cracking. Additionally, less than 1.3% of the plans in the ensemble have a larger Democratic in the two most Democratic districts than the enacted plan.

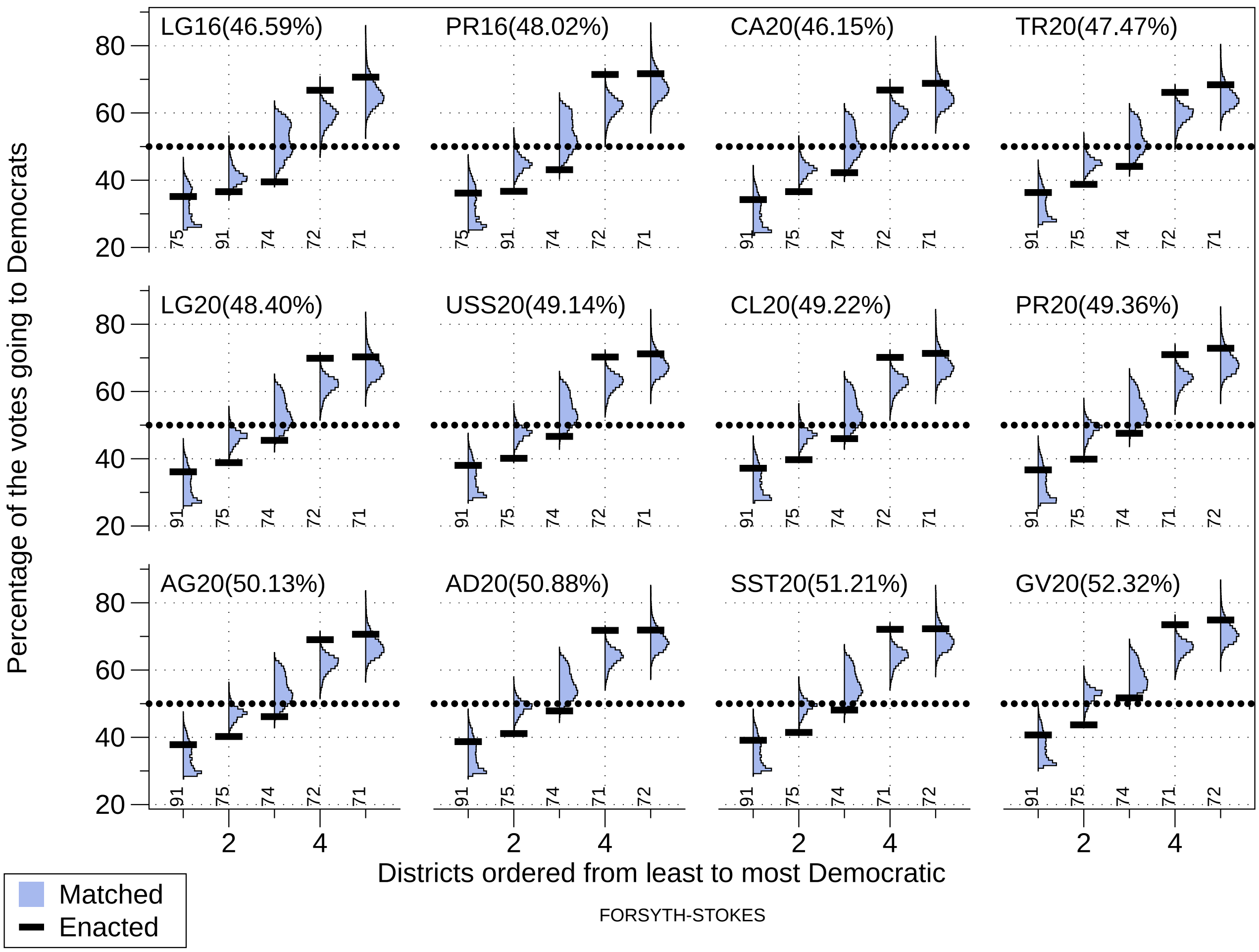


Figure 6.1.7: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

As shown in Figure 6.1.8, the trend continues under the secondary ensemble which better preserves municipalities. Some of the effects are more extreme and in this cluster, this ensemble leads to more partisan districts. Nonetheless, the enacted map still regularly elects a Republican in the third most Republican district even thought it is typically more firmly Democratic under this ensemble.

Municipal Splits and Ousted Population:

From Figure 6.1.9, we see that in Forsyth-Stokes the enacted plan ousts a number of people comparable to the primary ensemble but consistently more than the secondary ensemble.

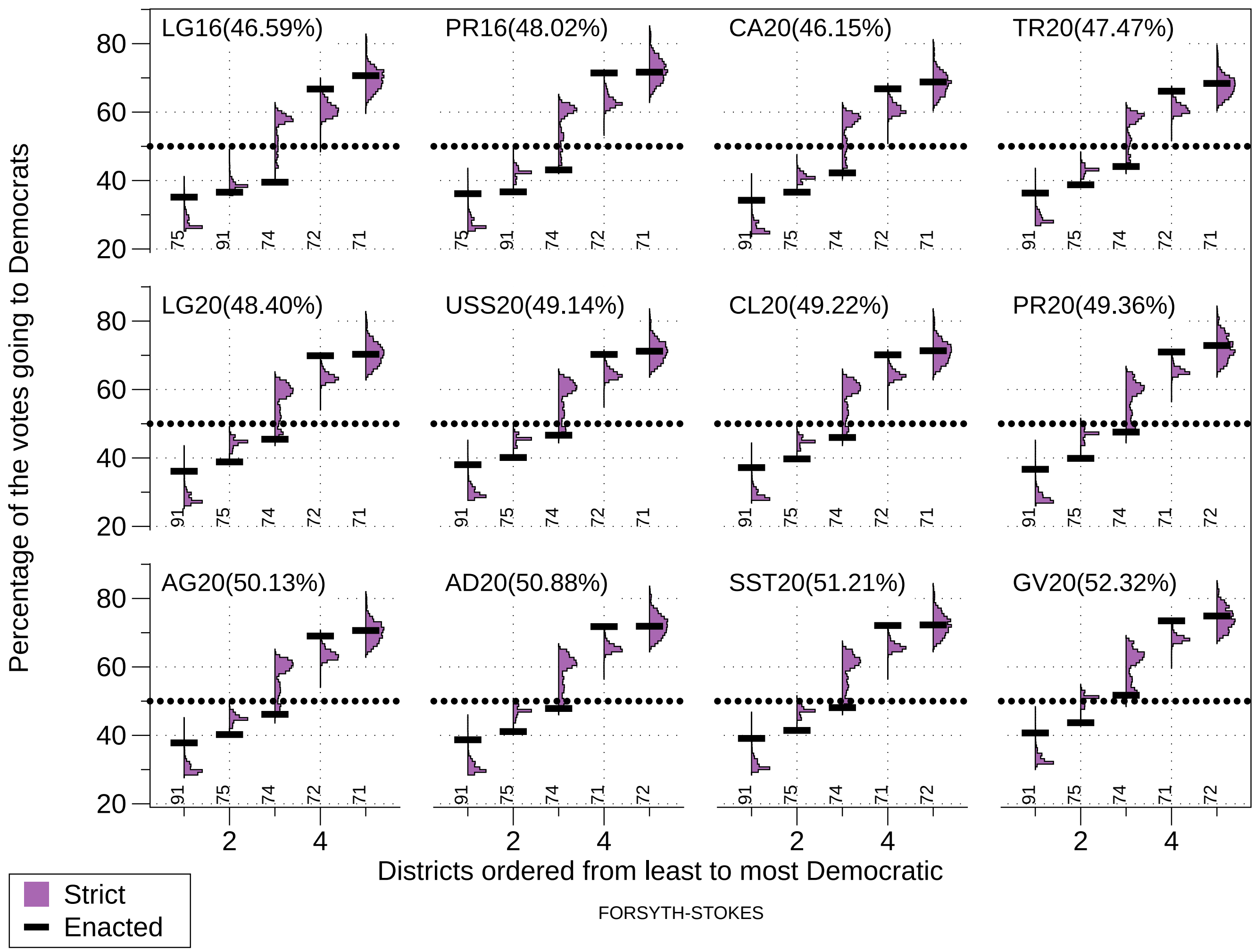


Figure 6.1.8: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

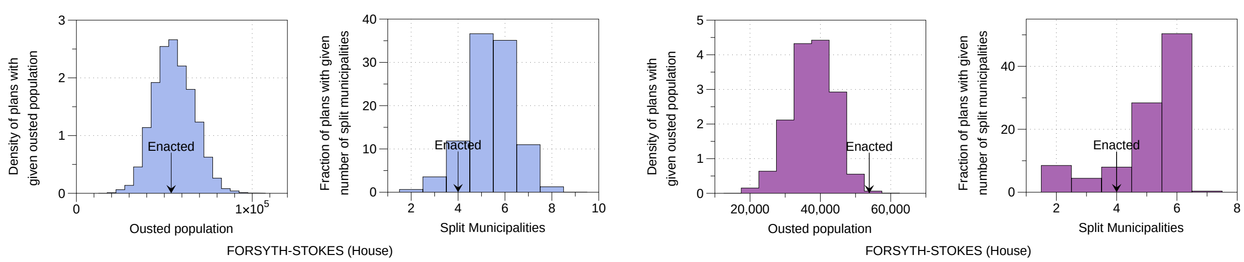


Figure 6.1.9: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.4 Guilford

The pattern seen previously is again repeated in an extreme fashion in the Guilford County. The two most Republican Districts (districts 59 and 62) have abnormally few Democrats when compared to what is seen in the primary ensemble and the more Democratic districts (numbered 57, 58, 60, and 61) have exceptionally many Democrats packed into them. The effect is that the enacted plan regularly (and often safely) elects two Republicans under election climates which would rarely or never do so.

Over all of the elections considered and all of the around 80,000 plans in the ensemble, none of the plans have a higher Democratic fraction in the four most Democratic districts or a lower Democratic fraction in the two most Republican districts, in comparison to the enacted plan. . In other words, this cluster shows more cracking and packing of Democrats than every single plan in the nonpartisan ensemble.

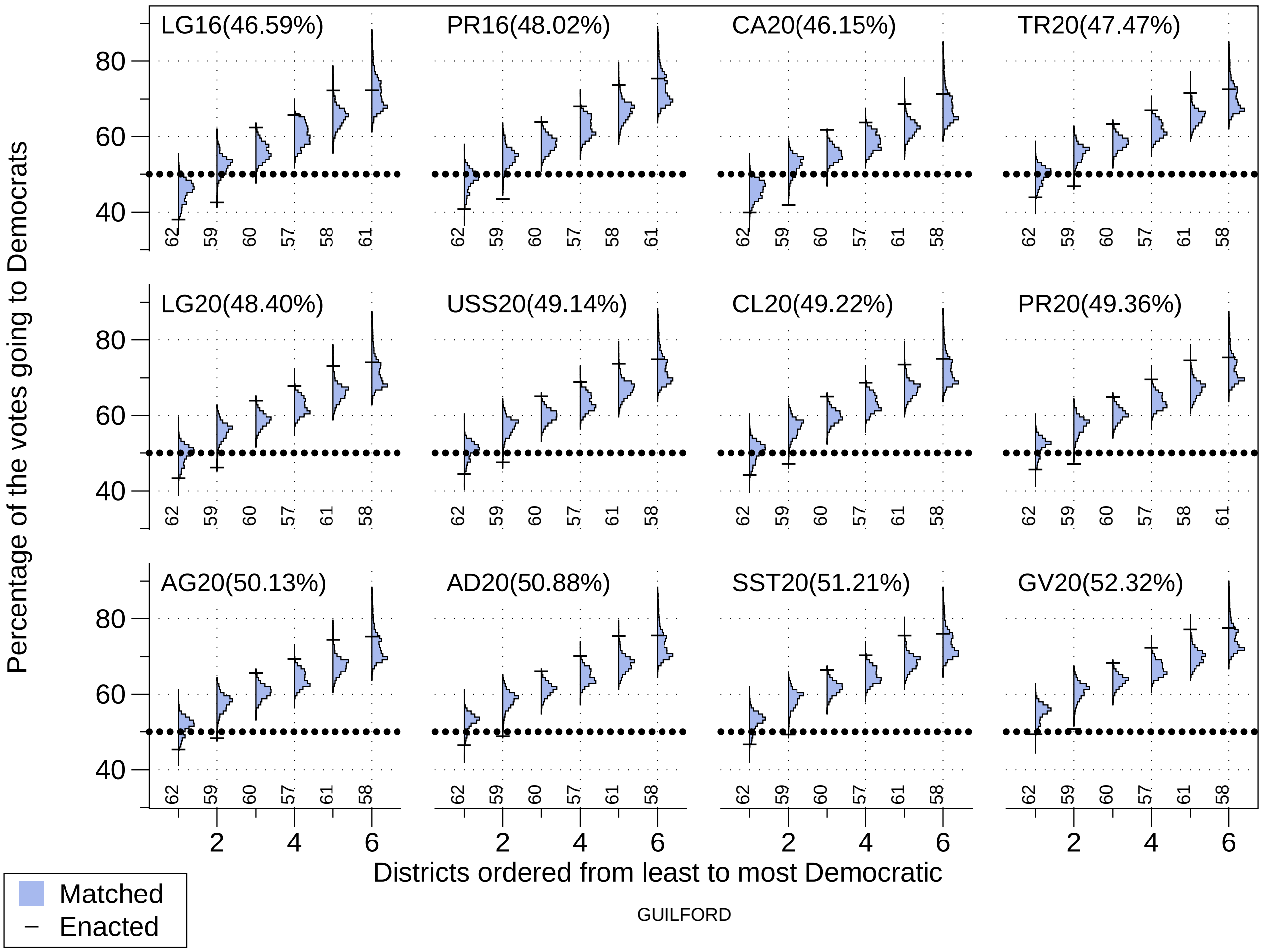


Figure 6.1.10: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

In Figure 6.1.11, we see the effect of considering the the ensemble that more strongly preserves municipalities than the enacted plan. The ensemble reliably has four democratic districts and a 5th which typically leans Republican but sometimes is competitive. Yet, the enacted plan gives one clearly Republican district and one which is often safely Republican and at times competitive.

Municipal Splits and Ousted Population: From Figure 6.1.12, we see that in Guilford the enacted plan ousts a number of people comparable to the primary ensemble but constantly more than the secondary ensemble.

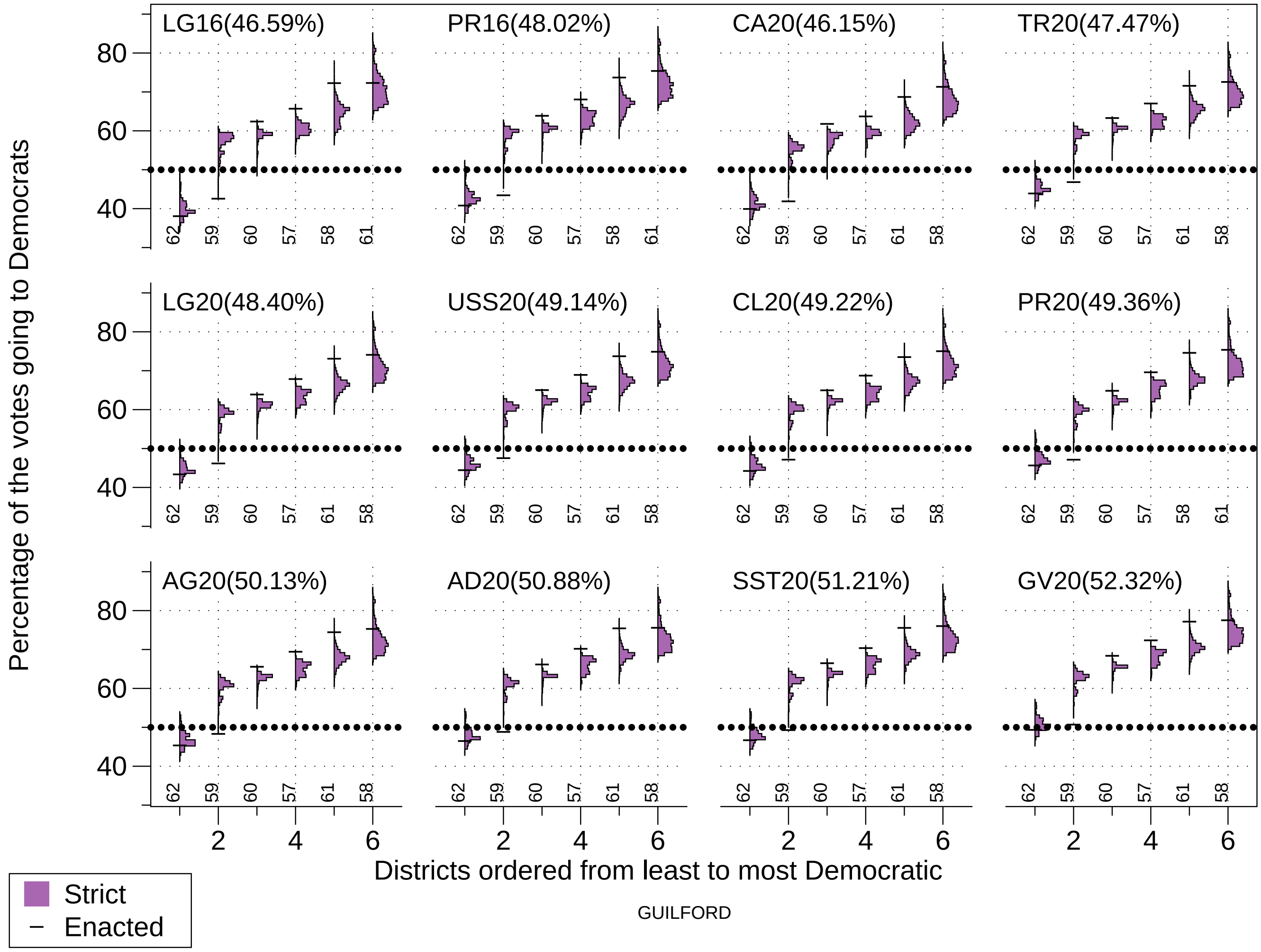


Figure 6.1.11: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

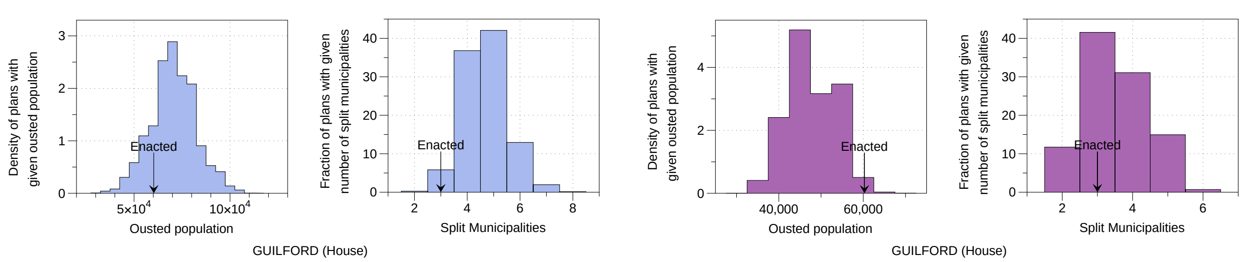


Figure 6.1.12: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.5 Buncombe

As seen in Figure 6.1.13, the primary ensemble shows two Democratic districts with a third typically leaning Democratic but sometimes in play. However, the enacted map produces one district which is typically Republican. This is achieved by packing unusually many Democratic in the most Democratic district (district 114) leaving abnormally few Democrats for the most Republican district (district 116).

Ranging over the elections considered, at most 1.2% of the plans in the ensemble have a lower democratic fraction in the most Republican district in the ensemble than the enacted plan does. The percentage of plans with a larger Democratic fraction in the most Democratic district in the ensemble fluctuates around 5%.

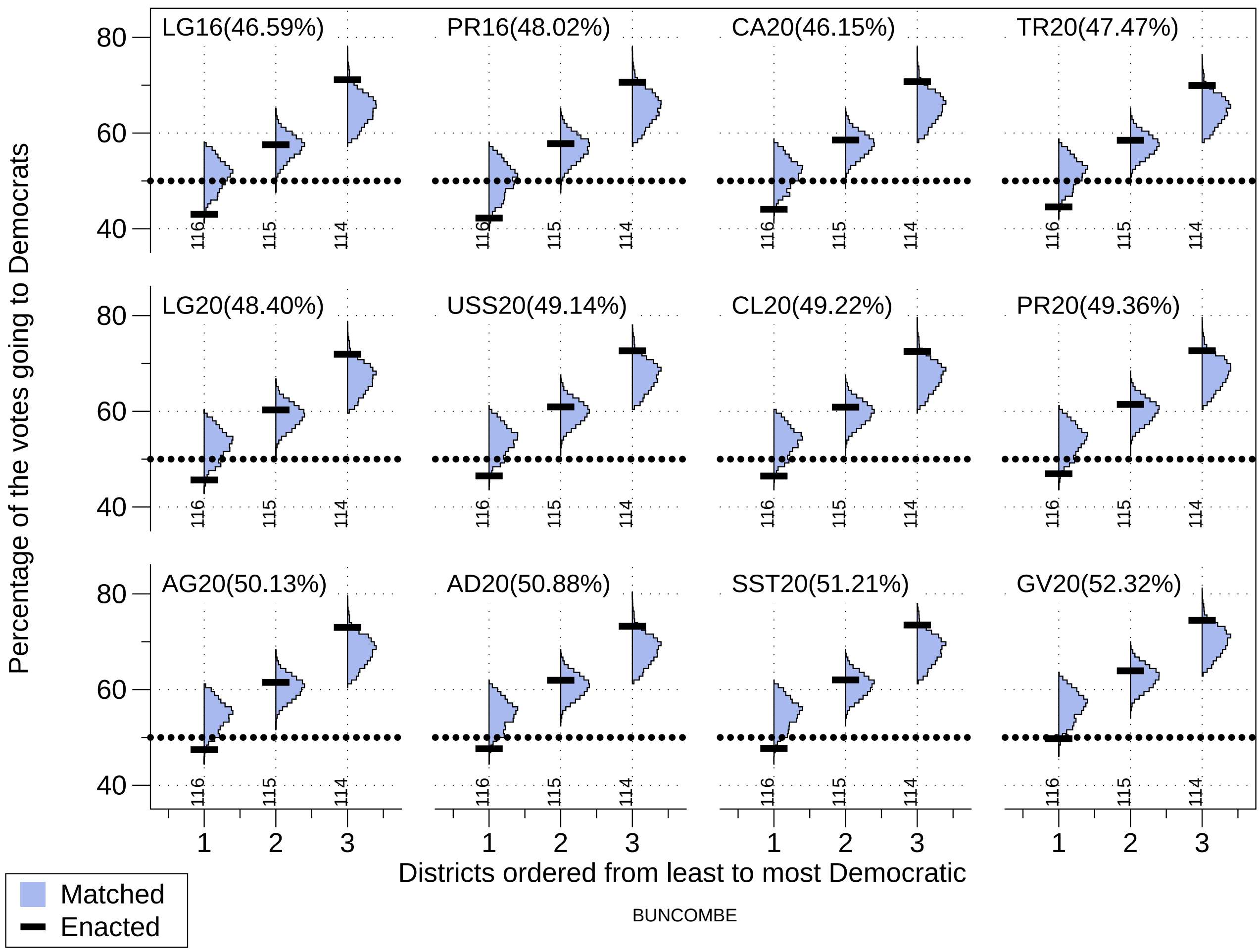


Figure 6.1.13: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

The same pattern of depleting Democrats from the most republican district so that it often elects a Republican when it typically would not under the ensemble is again seen in Figure 6.1.14 which shows the results under the secondary ensemble.

Municipal Splits and Ousted Population: From Figure 6.1.15, we see that there is not a lot of difference between the two ensembles in the number of ousted people. Both are comparable to the enacted map.

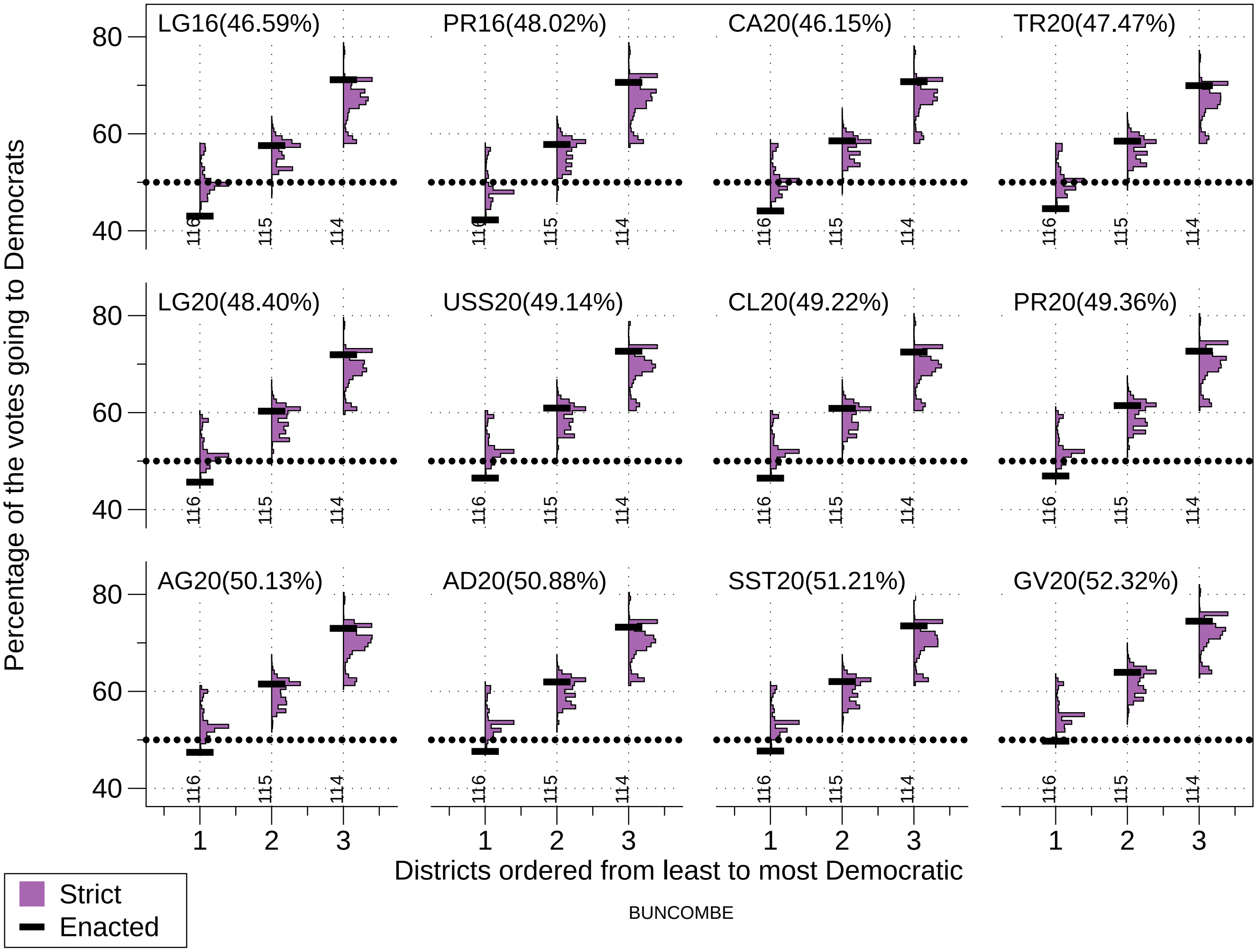


Figure 6.1.14: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

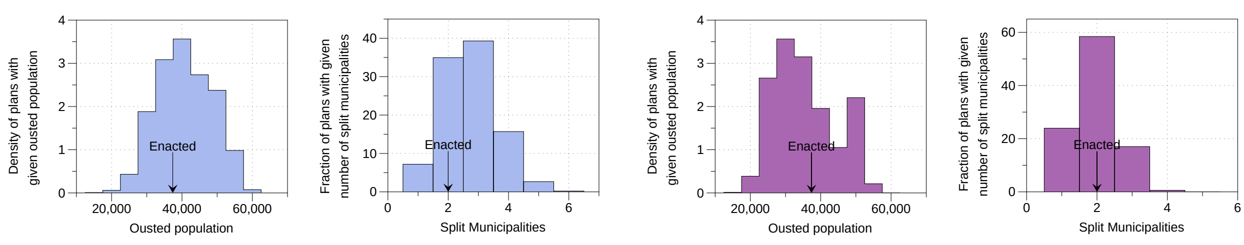


Figure 6.1.15: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.6 Pitt

Pitt County only has two districts. The enacted places atypically many Democrats in the most Democratic district (district 8) while placing atypically few in the most Republican district (district 9). This maximizes the chance that the second district will elect a republican. In many cases, it does when many of the ensemble maps would not. By maximizing the difference in the partisan makeup of the two districts, the enacted map minimized the degree to which the enacted map responds to the shifting opinions of the electorate.

Across the elections considered, the percentage of plans in the ensemble which have a higher fraction of Democrats in the most Democratic district than the enacted plan fluctuates between 1.1% and 5.3%.

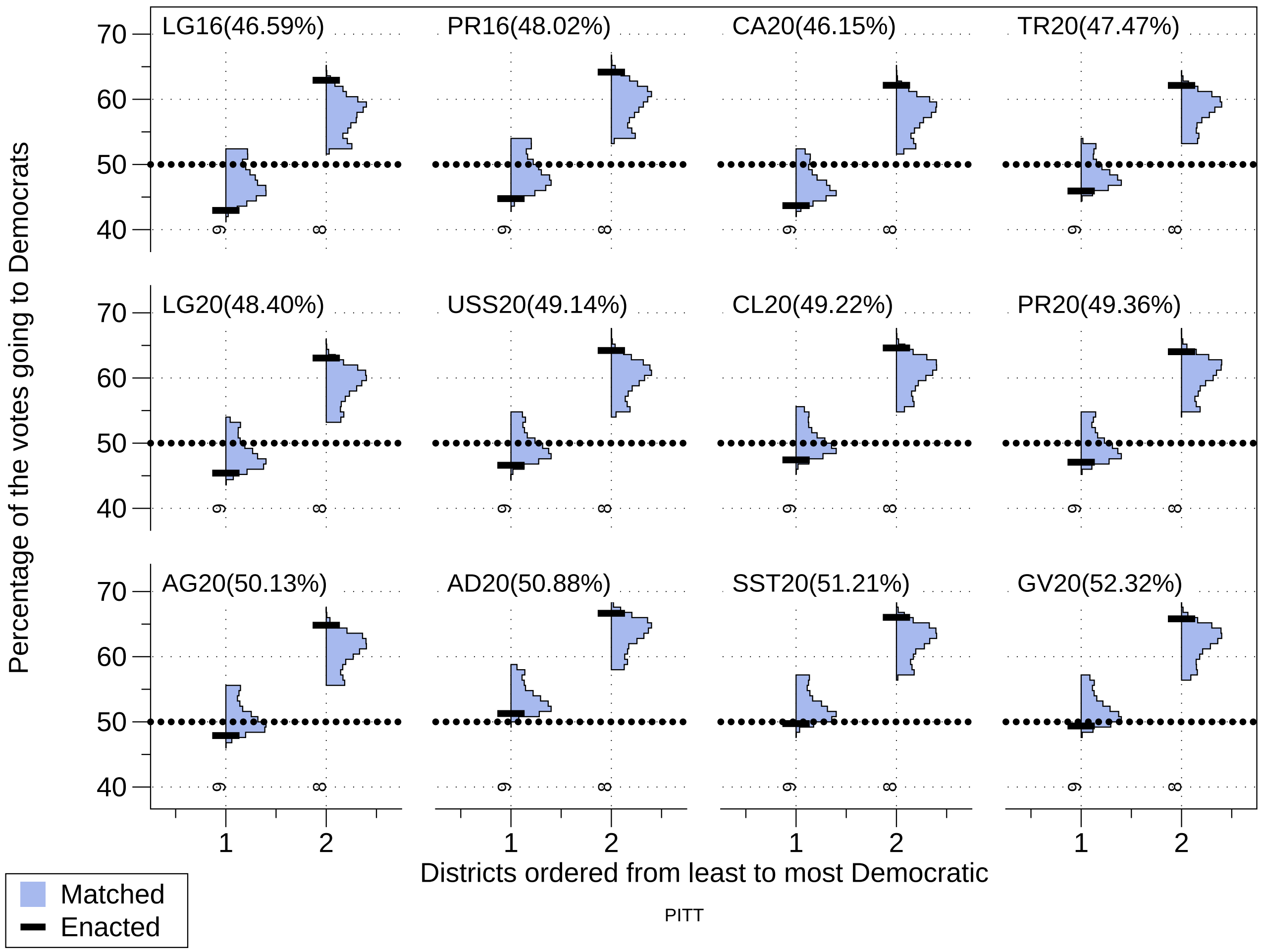


Figure 6.1.16: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

The same pattern is repeated in Figure 6.1.17 which uses the secondary ensemble which better preserves municipalities than the enacted map.

Municipal Splits and Ousted Population: From Figure 6.1.18, we the number of ousted people in the primary ensemble is comparable to the enacted plan but more than the secondary ensemble.

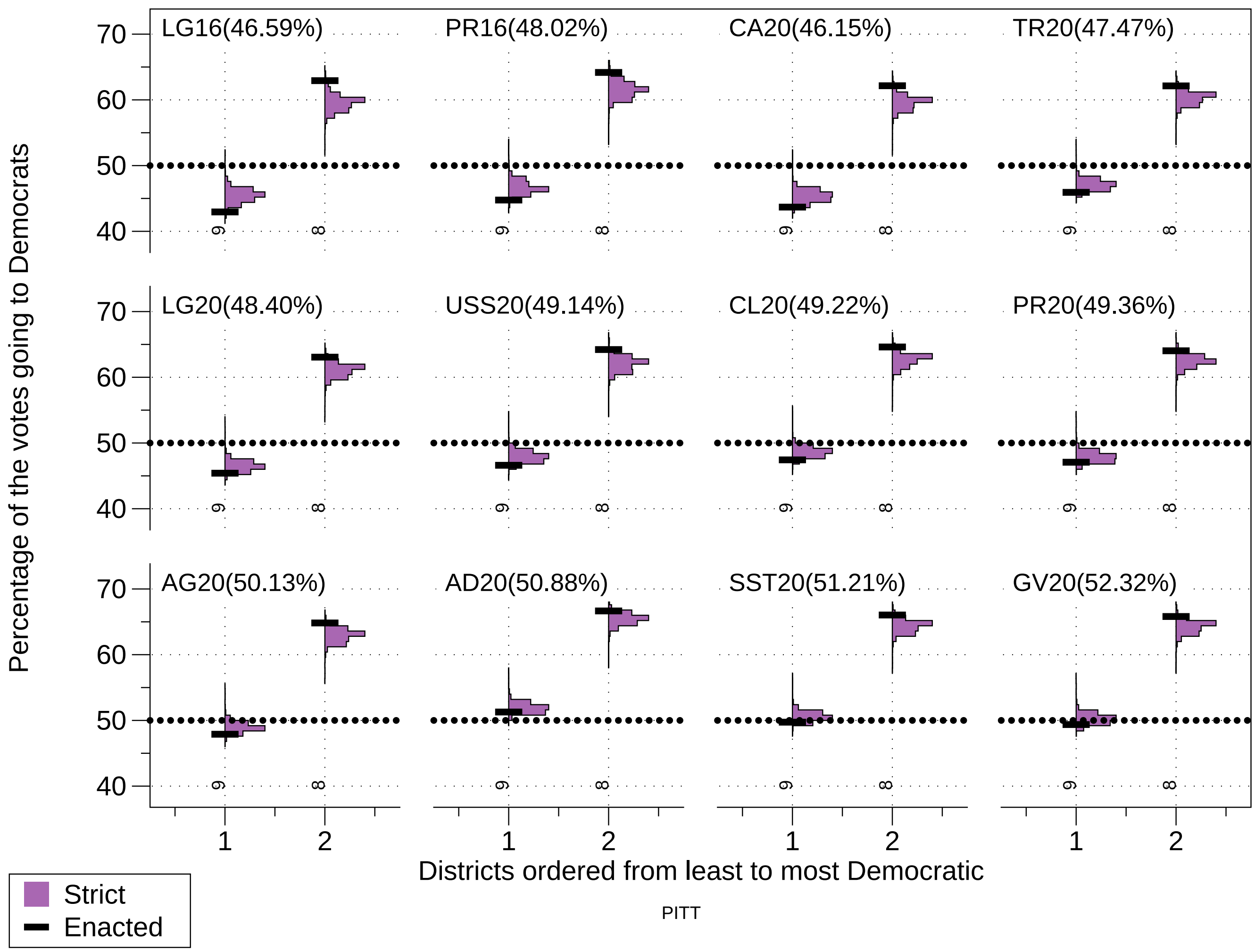


Figure 6.1.17: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

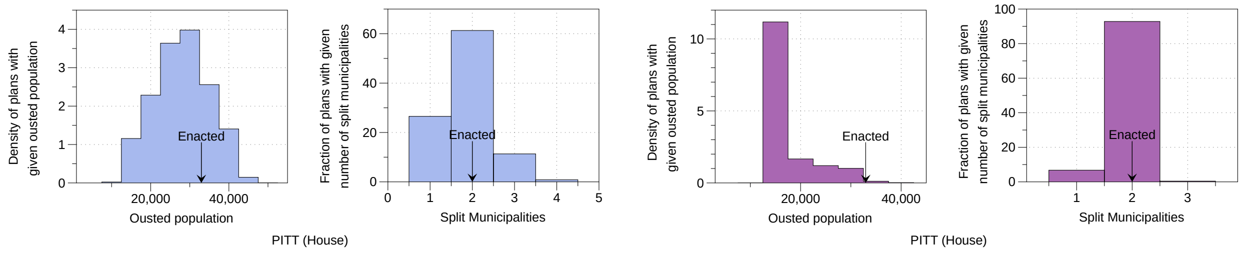


Figure 6.1.18: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.7 Duplin-Wayne

In the Duplin-Wayne county cluster the two districts are safely Republican under the elections considered. The enacted map is typical, falling in the middle of the observed democratic fraction on the Histograms.

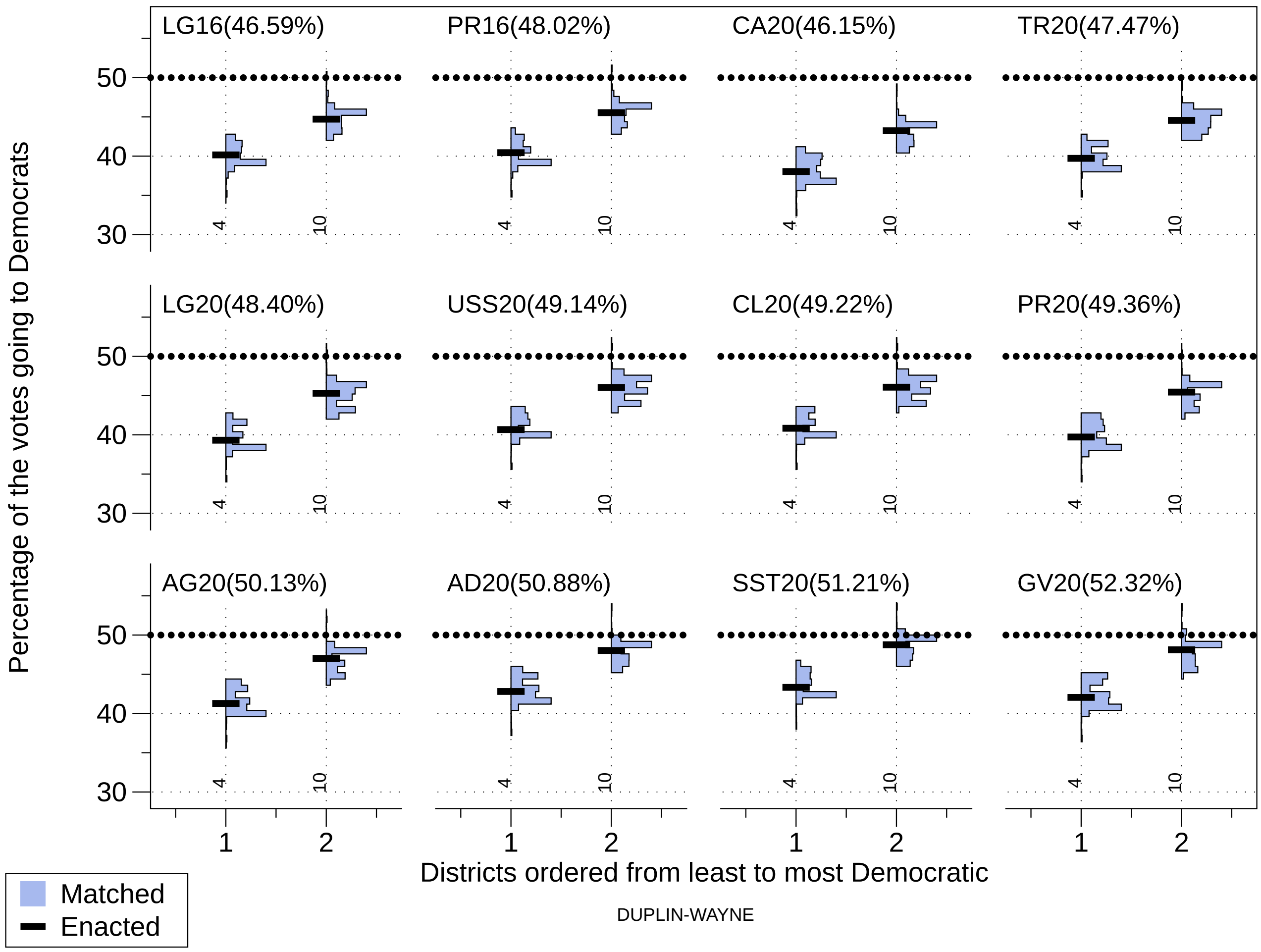


Figure 6.1.19: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

As seen in Figure 6.1.20, the distribution has extremely small variance when municipalities are better preserved. Here there seem to be a little less Democrats in the most Democratic district than typical, but this has little effect as the two districts are firmly Republican and the distribution is highly concentrated.

Municipal Splits and Ousted Population: From Figure 6.1.21, we seen that the number of people ousted by the enacted plan is at the lower end of the typical amounts seen in the Primary ensemble or the secondary ensemble.

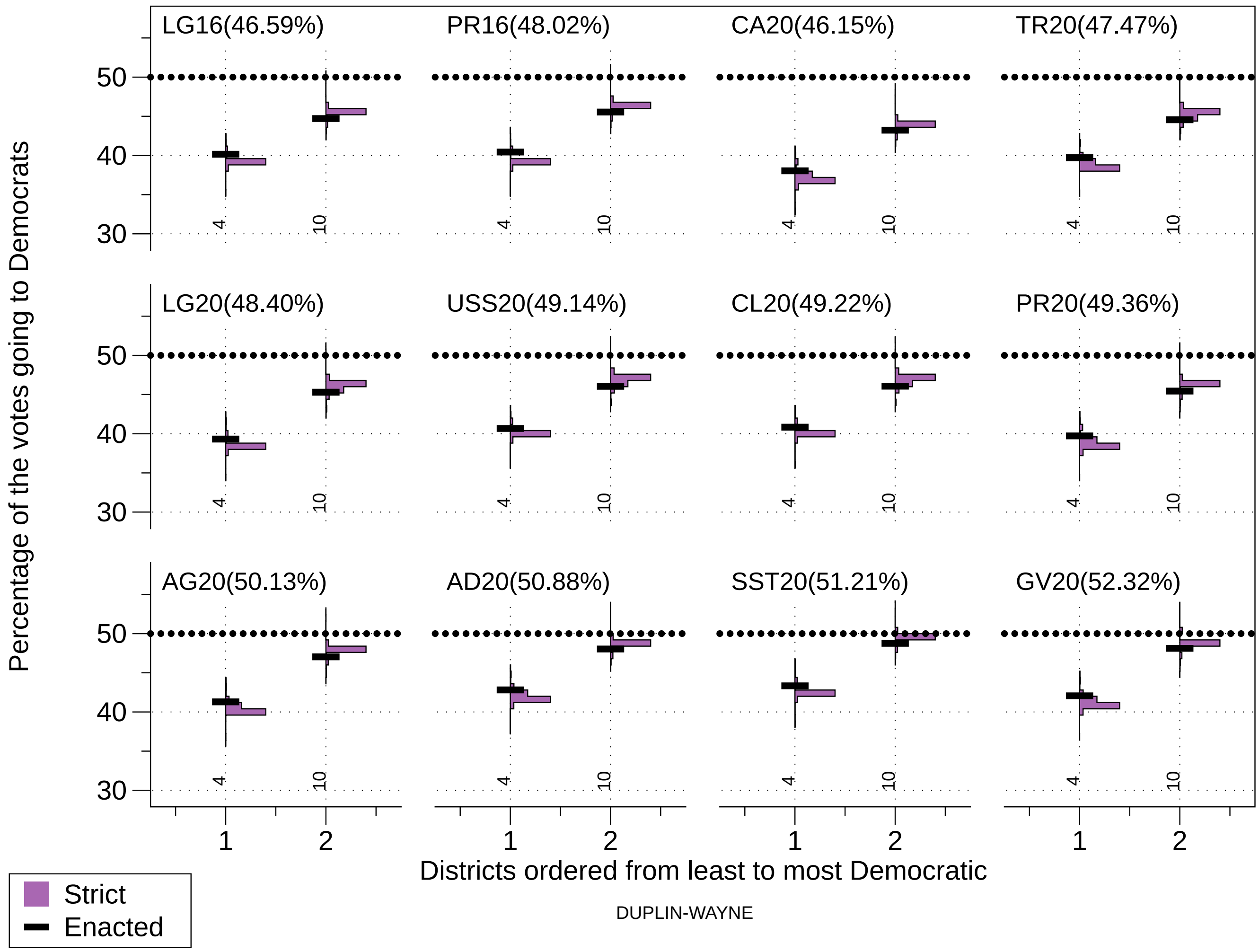


Figure 6.1.20: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

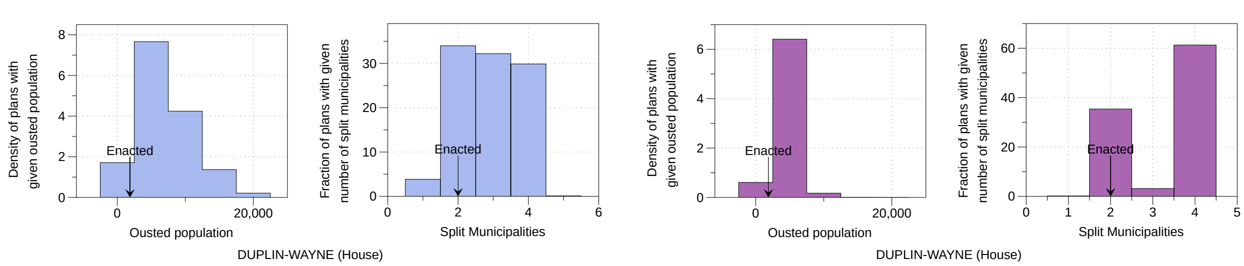


Figure 6.1.21: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.8 Durham-Person

As seen in Figure 6.1.22, under the primary ensemble Durham-Person cluster typically has three exceedingly Democratic districts and one more moderately Democratic district. The enacted plan places abnormally few Democrats in the most Republican district (district 2). This is accomplished by packing more Democrats in the most Democratic districts (districts 29 and 30). The effect is sufficient to pick up a Republican seat in a few elections where the seat typically would have remained democratic according to the non-partisan primary ensemble.

Not a single map in the non-partisan ensemble across any of the elections considered has a smaller fraction of Democrats in the most Republican district than the enacted plan does. This signals extreme cracking. In all but two elections the fraction of plans which have a higher Democratic vote fraction than the enacted plan is less than 0.62%. The two exceptions are LG16 (3.5%) and CA20 (1.2%).

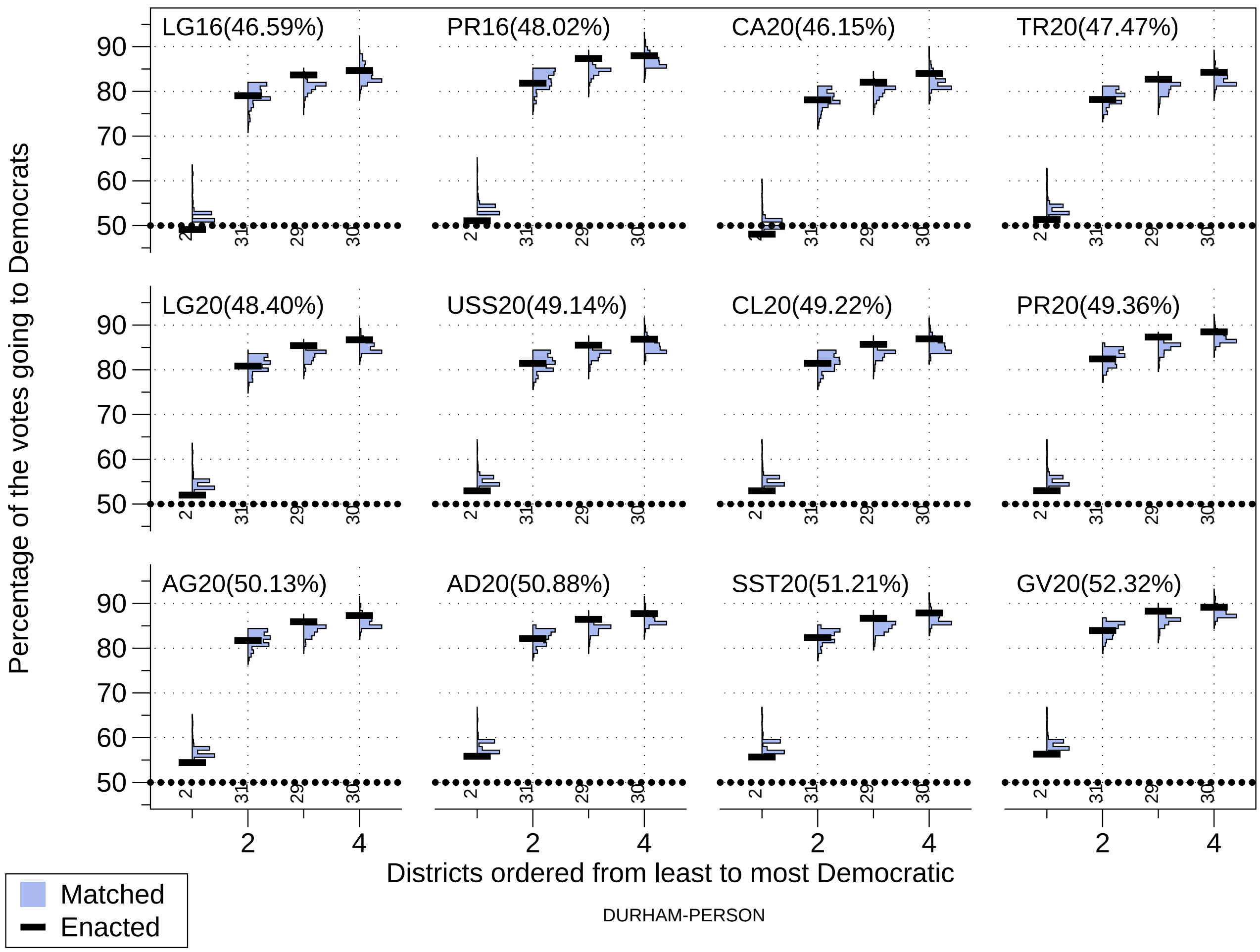


Figure 6.1.22: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The “ – ” on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the “ – ”. This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

A similar effect is seen in 6.1.23, for the ensemble which better preserves municipalities.

Municipal Splits and Ousted Population:

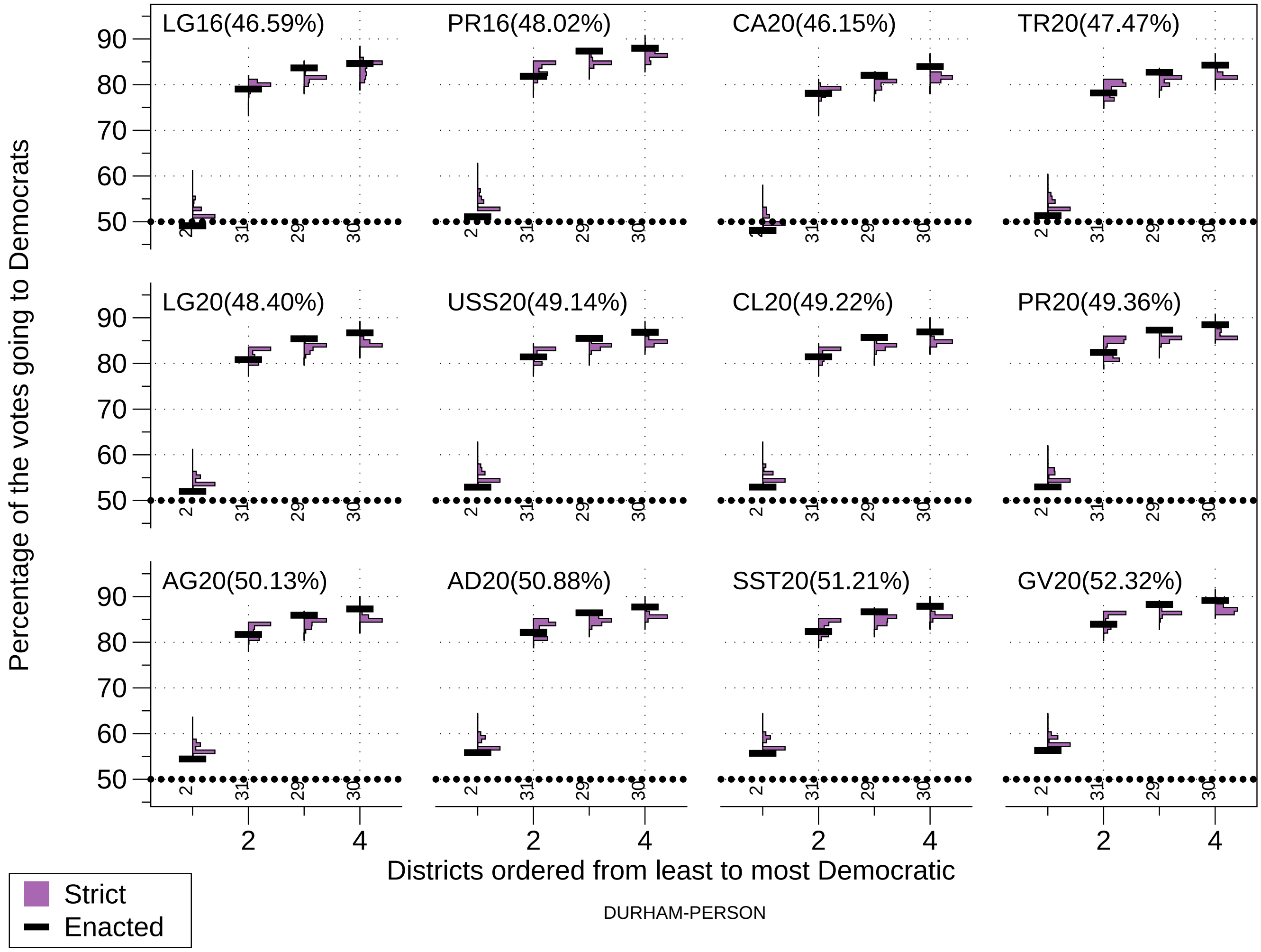


Figure 6.1.23: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The “ – ” on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the “ – ”. This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

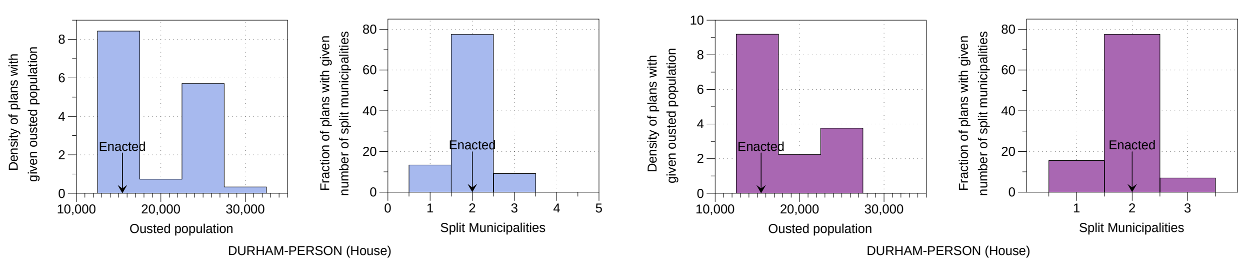


Figure 6.1.24: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.9 Alamance

From Figure 6.1.25, we see that though the enacted map tends have more Democrats in the more Democratic district and less in the less democratic district it not an outlier on its own.

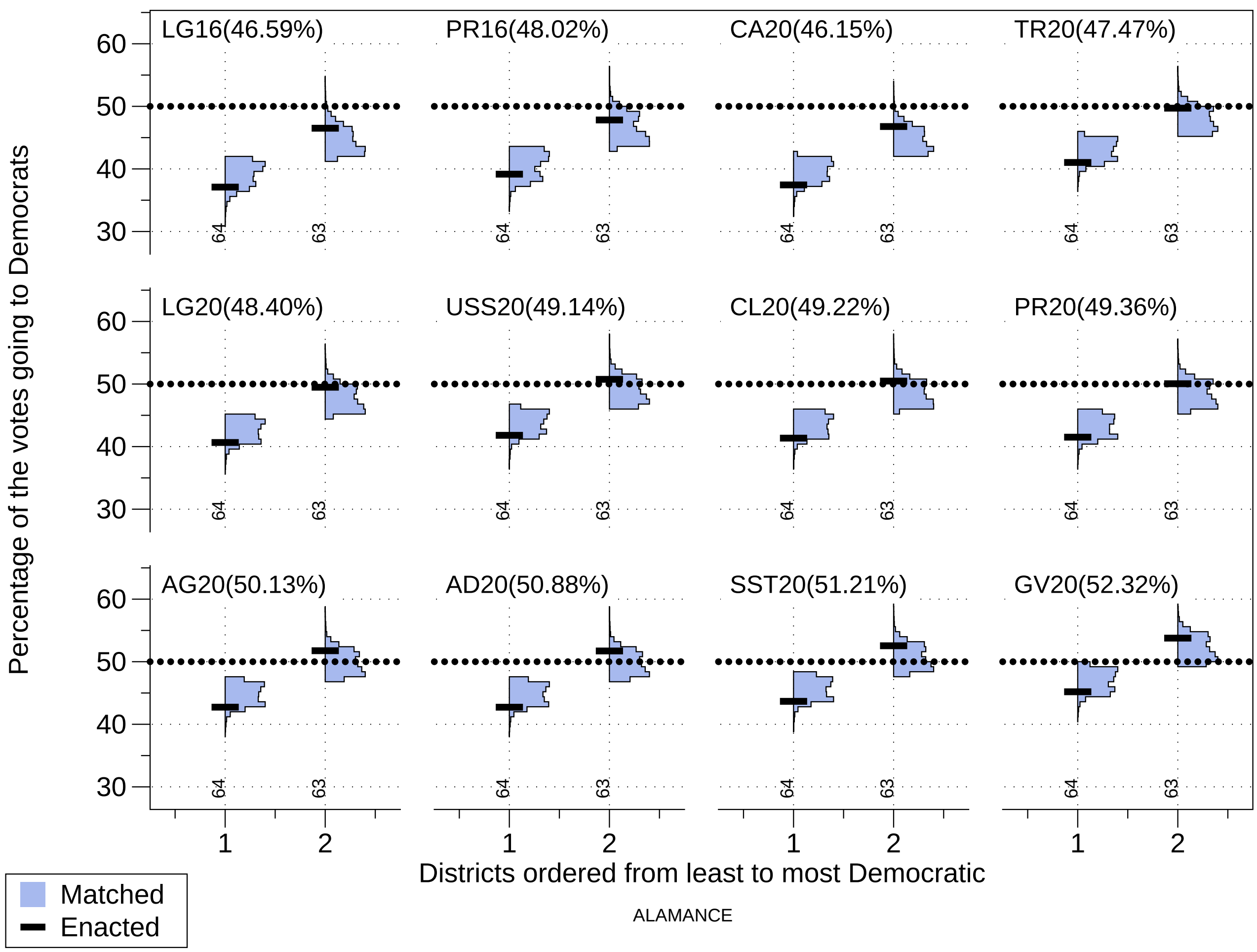


Figure 6.1.25: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

Figure 6.1.26 tells a similar story to Figure 6.1.25,

Municipal Splits and Ousted Population:

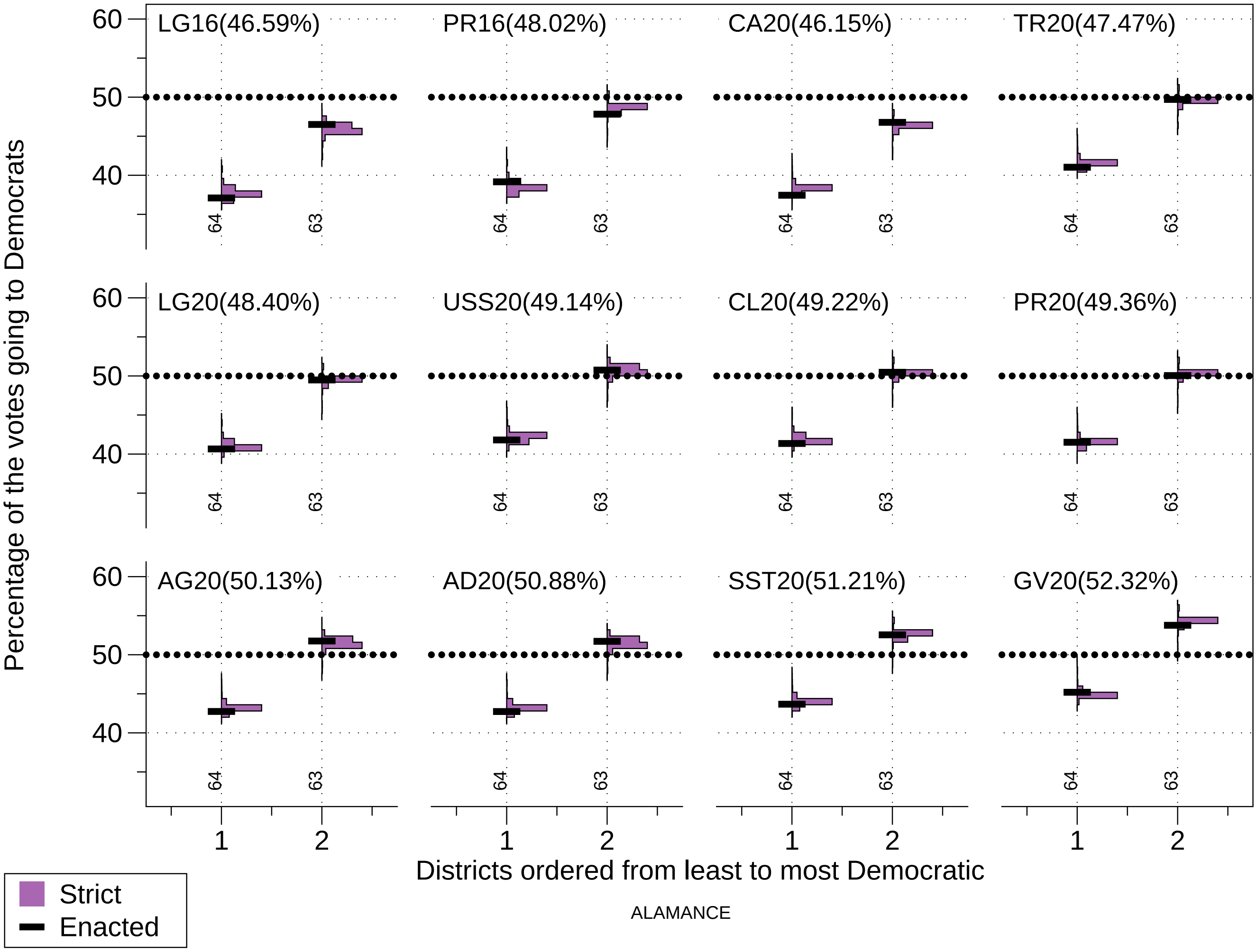


Figure 6.1.26: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

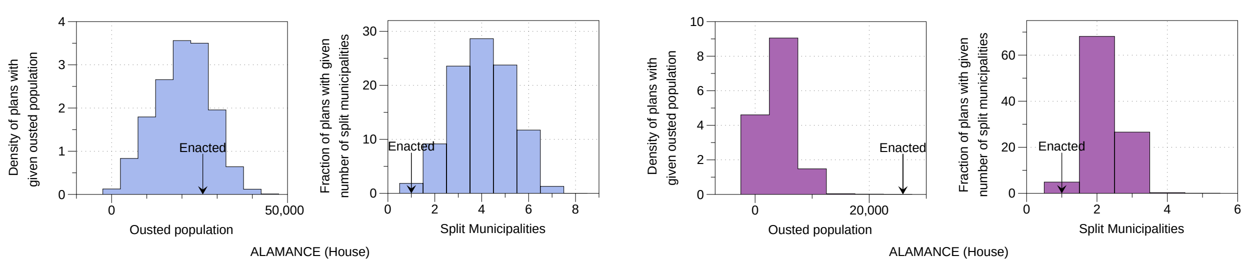


Figure 6.1.27: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.10 Cumberland

Looking at Figure 6.1.28, we again see outlier behavior in Cumberland County. We see that the districts in the enacted plan have been constructed so that the two most Republican districts (district 43 and 45) have a similar partisan makeup. Typically, one is more Democratic and one is more Republican. This is achieved by removing republicans from the most republican district and Democrats from the most democratic two districts. While the effect on the most Republican district individually is within the typical range, the combined effect creates an enacted cluster which is an strong outlier.

For each of the elections considered, the number of plans in the ensemble with smaller fraction of democrats in the second most republican district is typically around 1% with, for a few elections, the percentage reaching as high as 7% or as low as 0.4%.

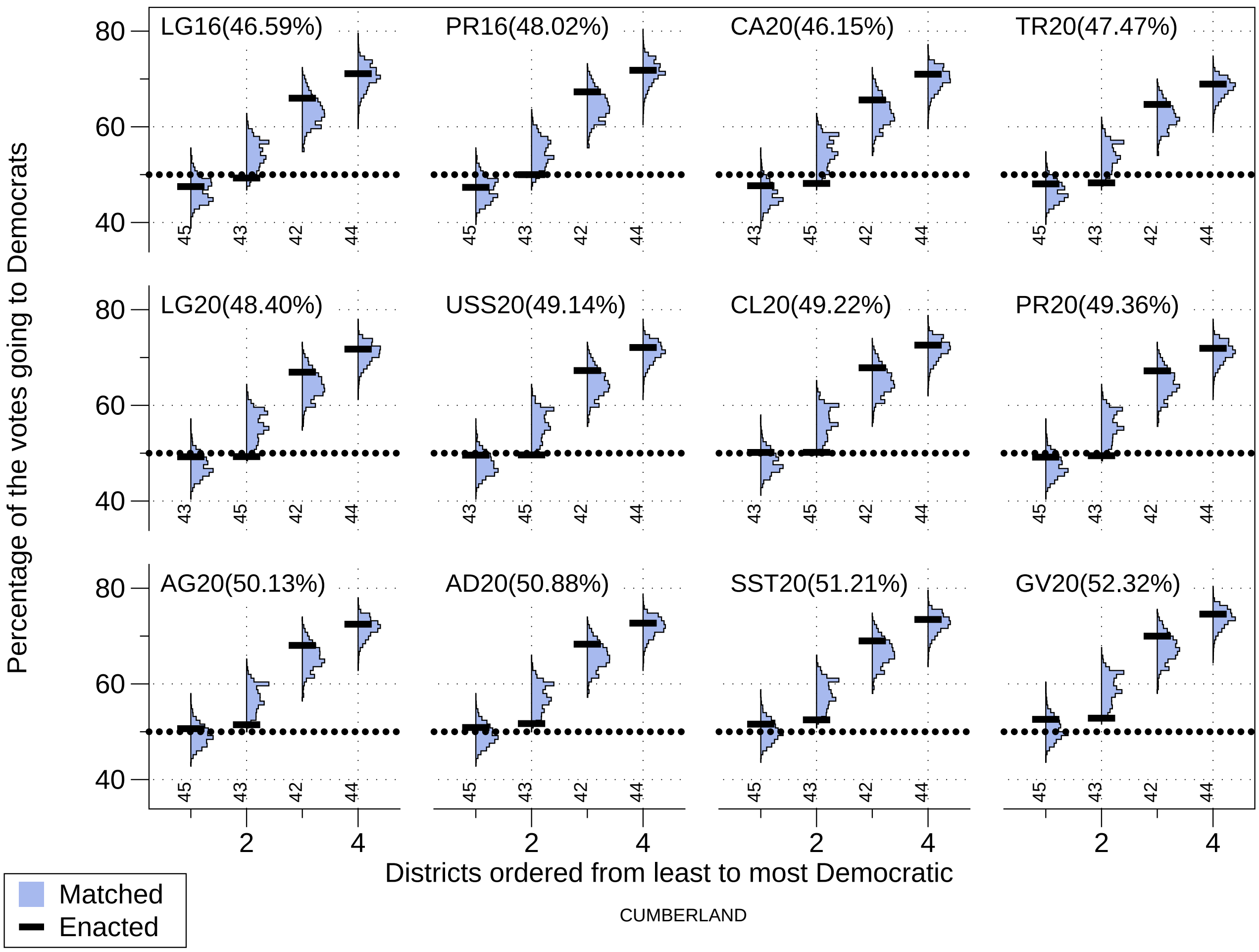


Figure 6.1.28: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

Looking at Figure 6.1.29, we see that the structure of the enacted map is a more extreme outlier for the secondary ensemble which better preserves municipalities. In an ensemble that better preserves municipalities, the most Republican district is typically more republican and the second most Republican district more Democratic. This makes the enacted plan which squeezes the two together with an large outlier.

Municipal Splits and Ousted Population:

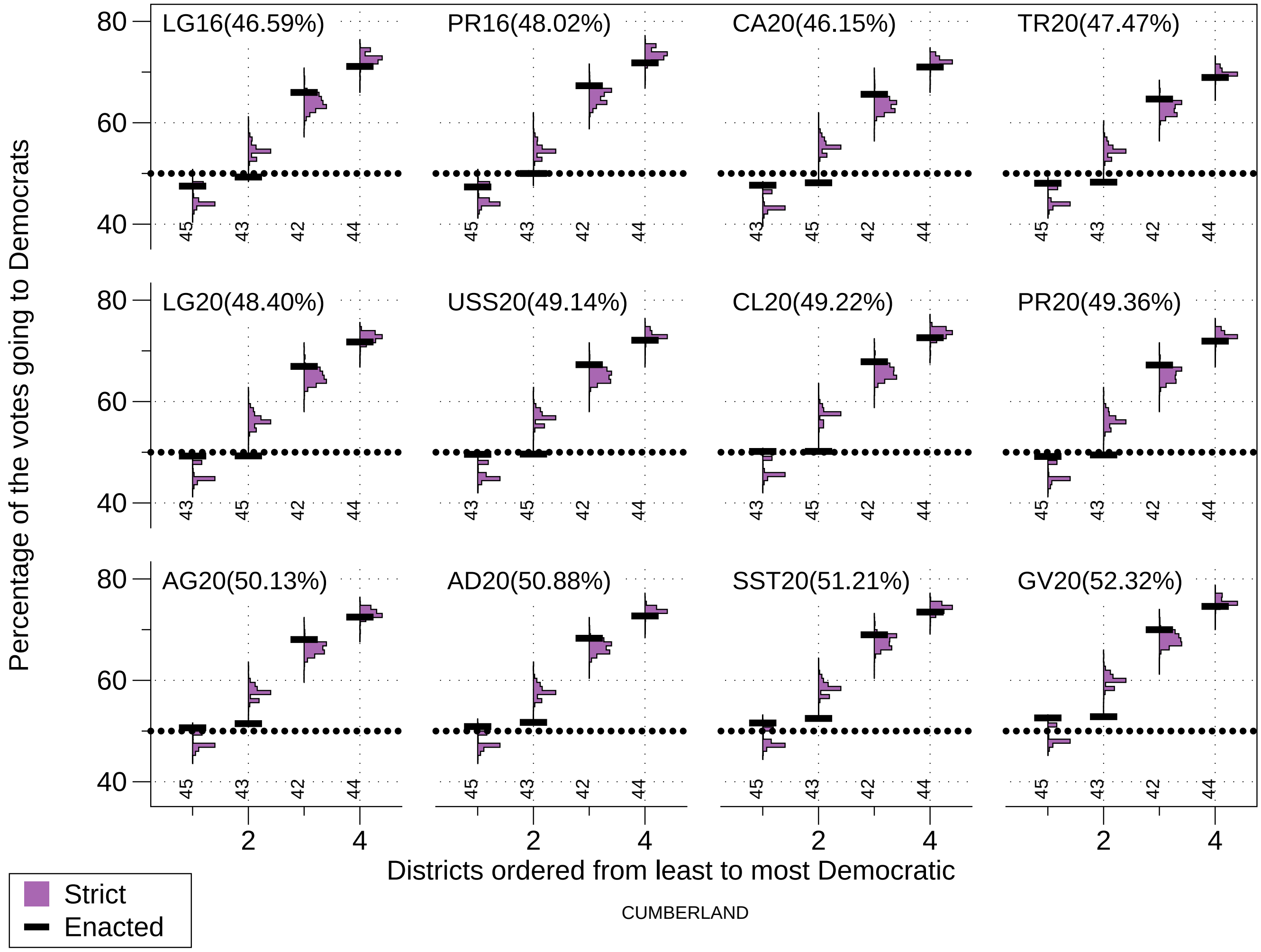


Figure 6.1.29: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The “ – ” on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the “ – ”. This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

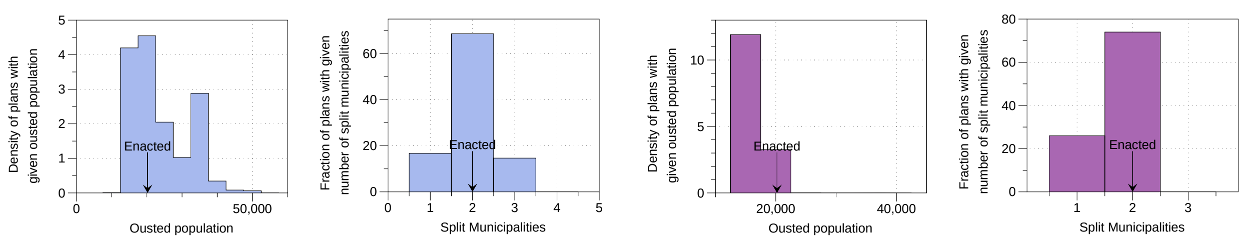


Figure 6.1.30: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.11 Cabarrus-Davie-Rowan-Yadkin

In the Cabarrus-Davie-Rowan-Yadkin county cluster, there are abnormally few Democrats in the most Democratic district (district 82). This is accomplished by placing abnormally many Democrats in the next three most democratic districts (districts 73, 76, and 83 – all of which are safe Republican districts). The effect is to make the most Democratic district a relatively reliable Republican seat (being won by the Republicans in all of the elections considered). Under the ensemble, it would switch parties in a number of the elections and regularly be a close contest.

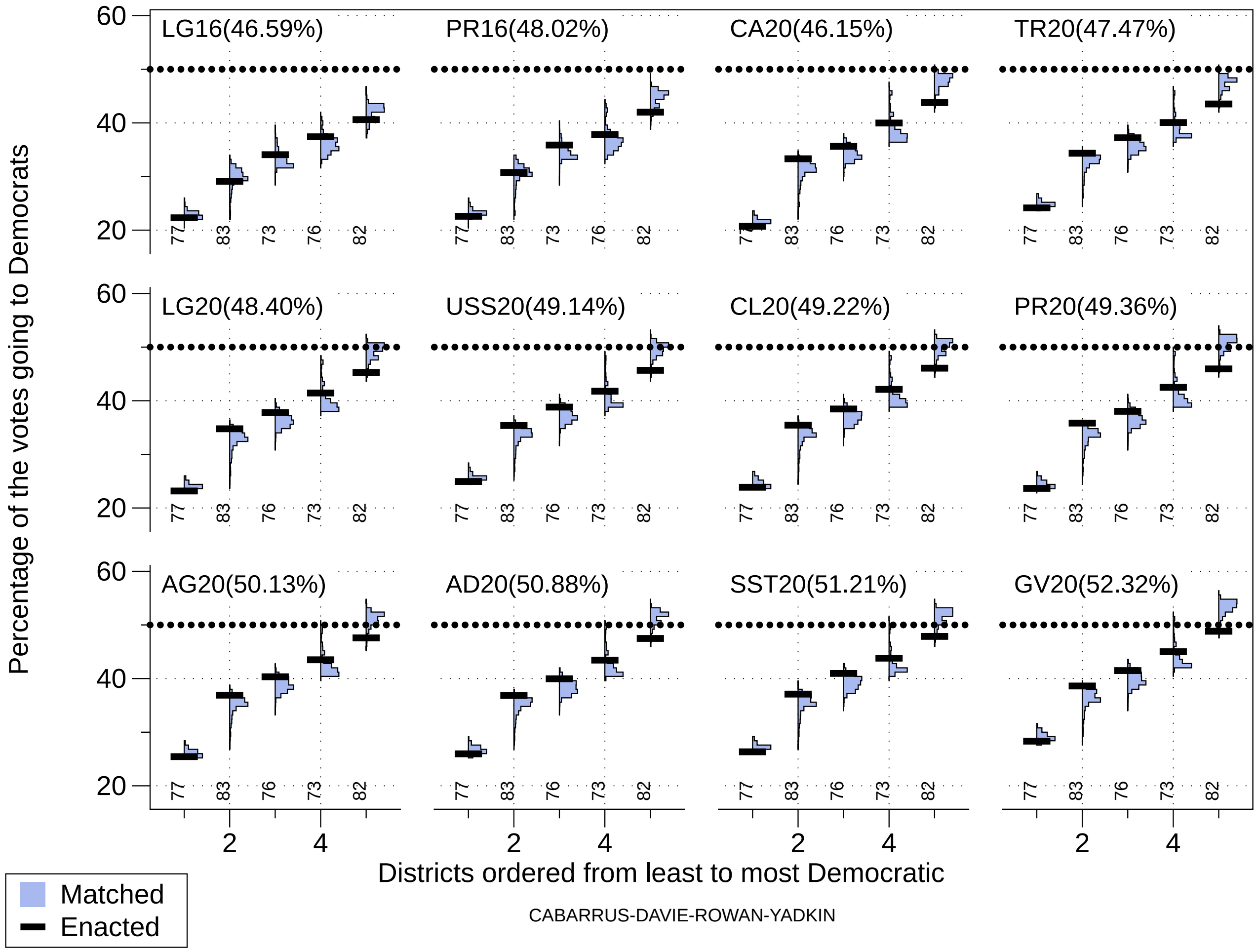


Figure 6.1.31: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

Looking at Figure 6.1.32, we see that the same pattern persists under the secondary ensemble which better preserves municipalities.

Municipal Splits and Ousted Population:

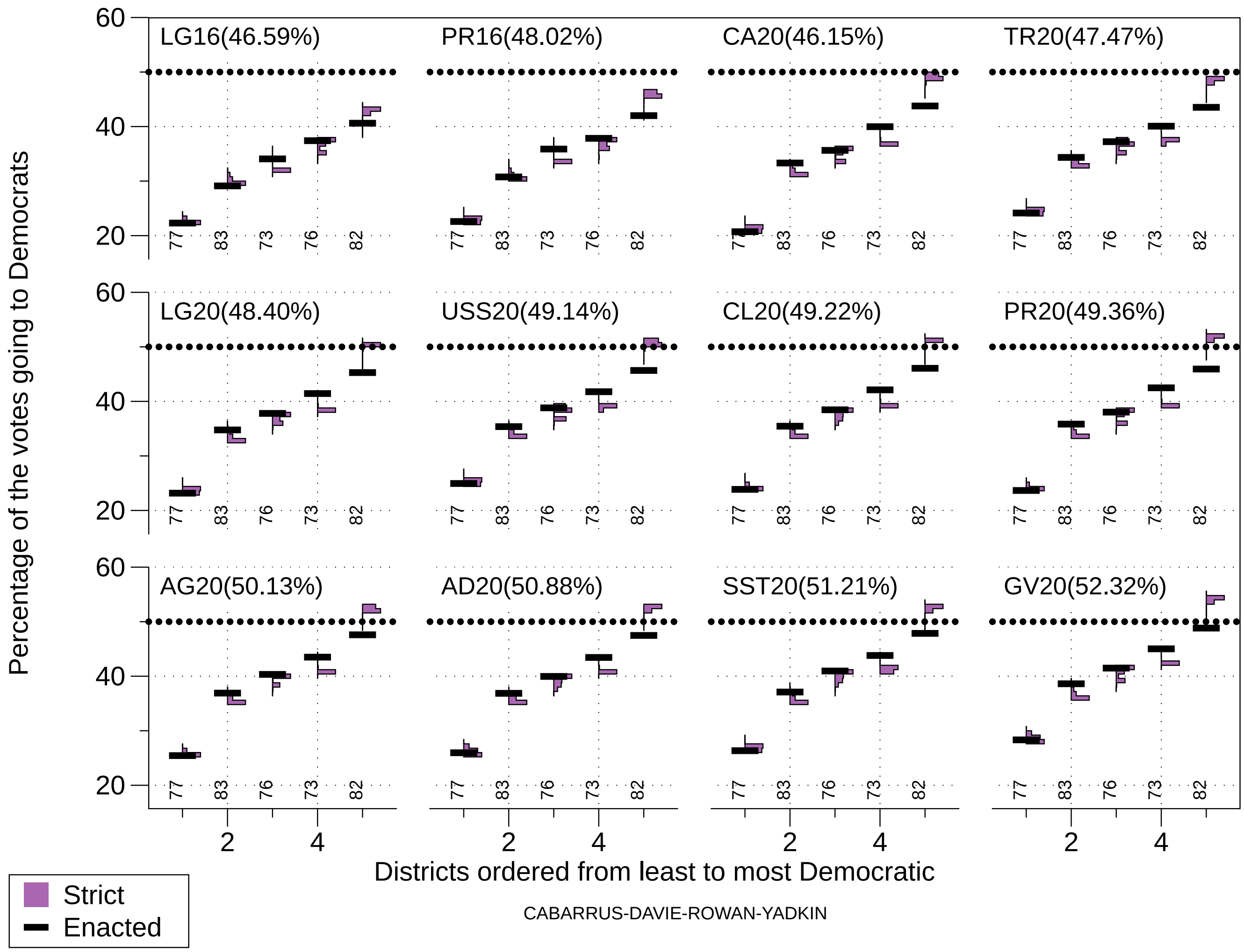


Figure 6.1.32: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The “ – ” on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the “ – ”. This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

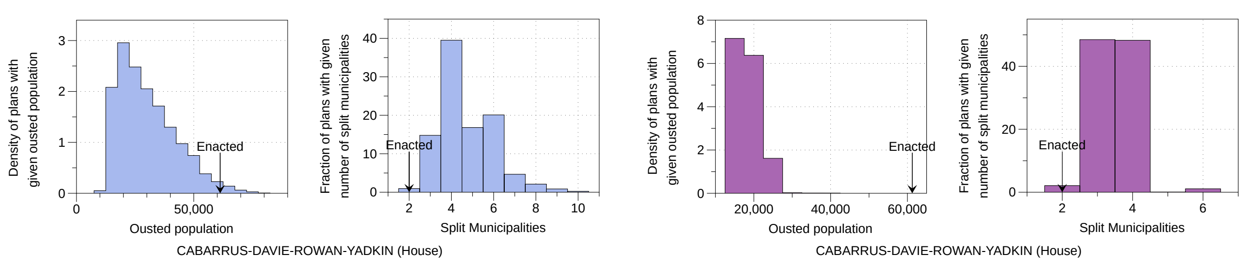


Figure 6.1.33: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.1.12 Brunswick-New Hanover

In the Brunswick-New Hanover county cluster, Figure 6.1.34 shows that the most Democratic district (district 18) has had abnormally many Democrats packed into it and the most Republican has had abnormally few Republicans placed in it, while the second-most Democratic district (district 20) has been depleted of Democrats. This makes the enacted plan much less responsive to changes in the the enacted plan preferences of the voters. The Republican party typically wins the second most democratic district in the enacted plan even though it would go to the Democrats under a number of elections when the neutral maps in the primary ensemble are used. Over each of the elections considered, the fraction of plans in the ensemble

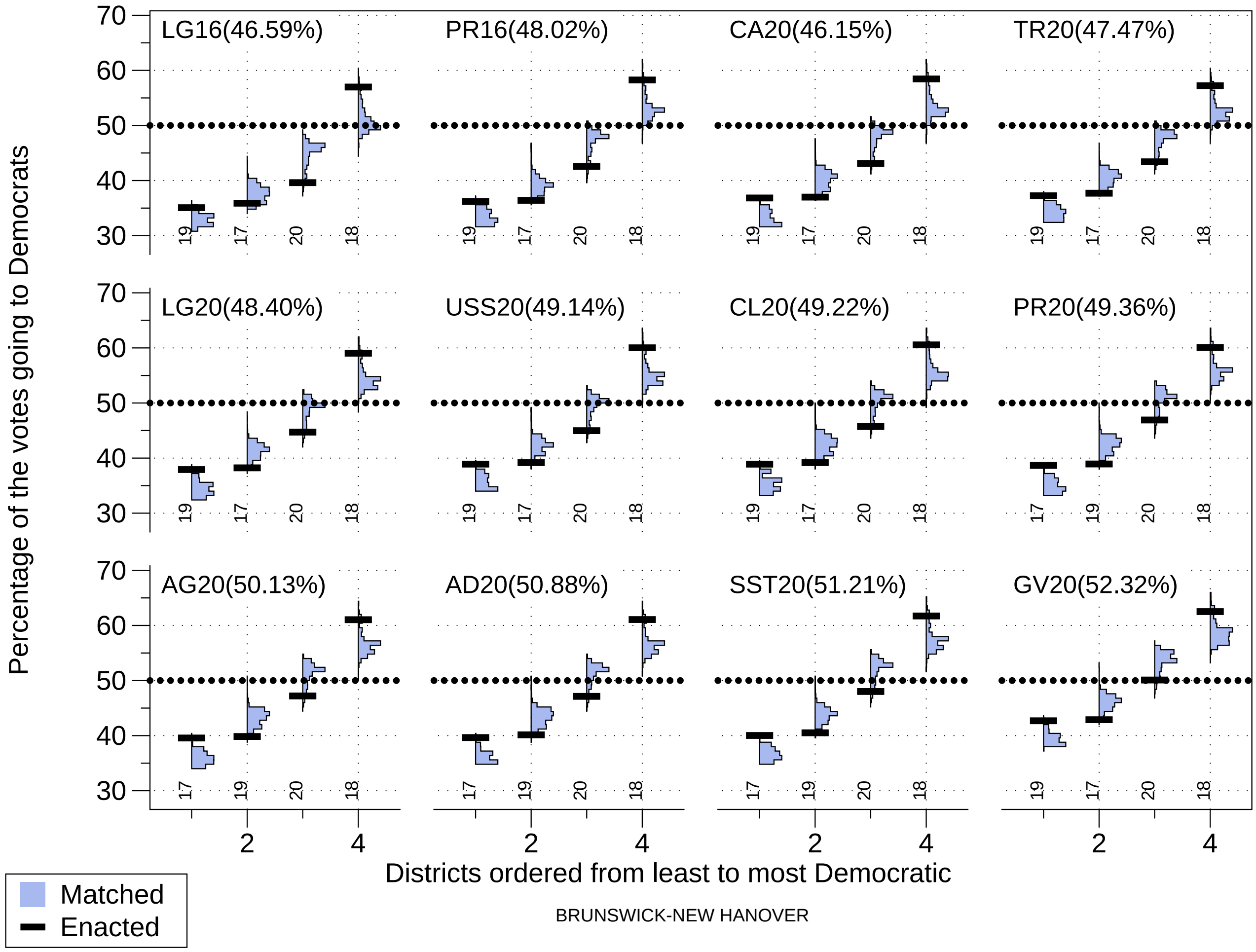


Figure 6.1.34: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

when a lower Democratic vote fraction in the second and third most Republican districts in the ensemble compared to the enacted plan map is always less than 0.5% and often much smaller.

Under the secondary ensemble which better preserves municipalities shown in Figure 6.1.35, we see that the same structure persists. The enacted map becomes a more extreme outlier since this ensemble reduced the variance of the marginals and aligns the outcome gradual progression which ensures the map is fairly responsive to changes in the voter's preference, a property not shared by the enacted map.

Municipal Splits and Ousted Population:

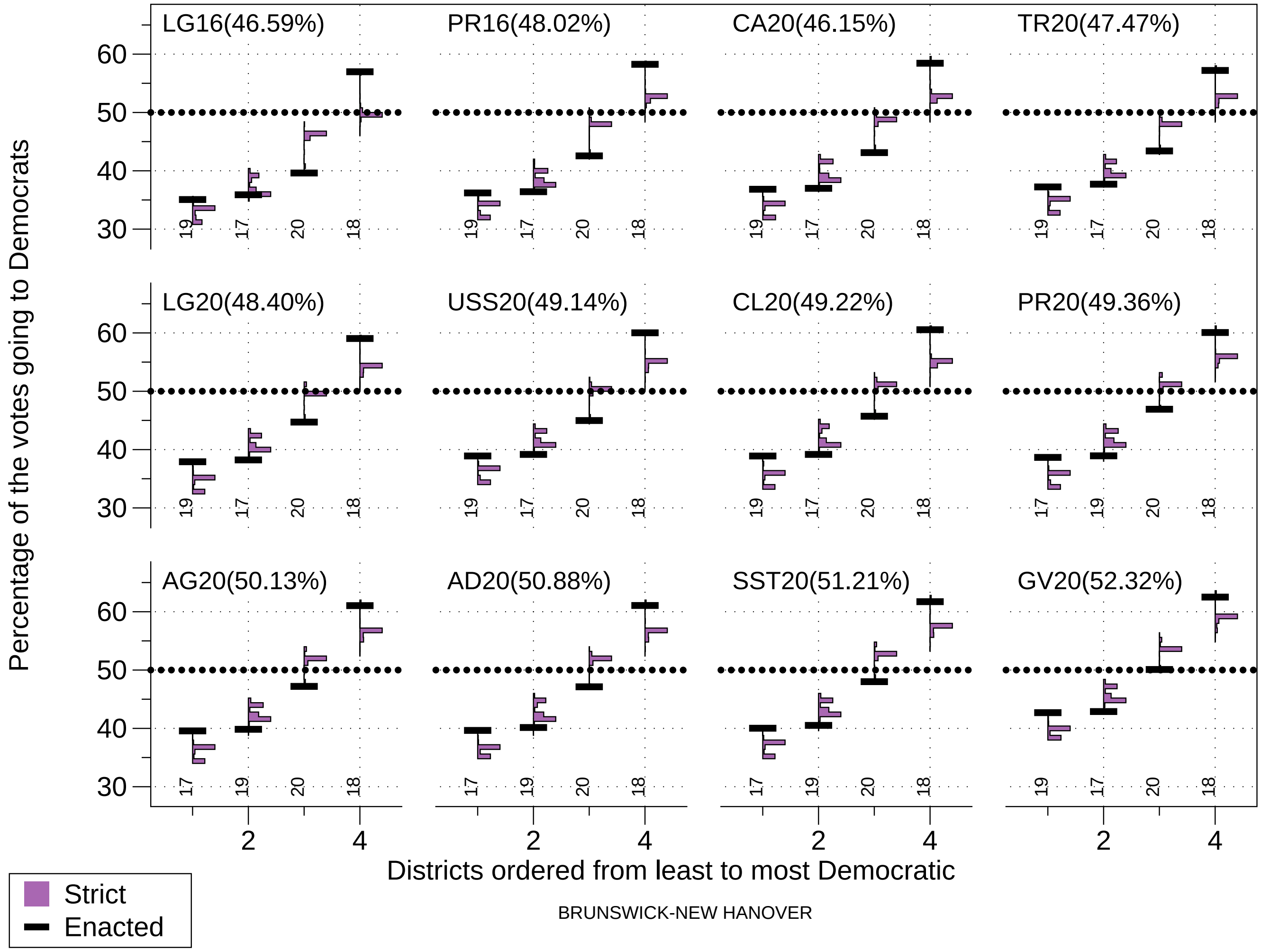


Figure 6.1.35: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Secondary ensemble which better preserves municipalities than the enacted plan.

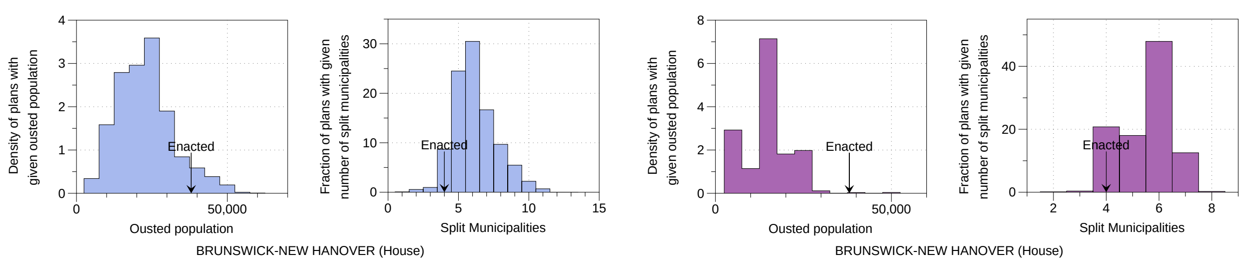


Figure 6.1.36: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.2 NC State Senate

Though the principal Senate ensemble, which prioritizes municipality preservation in line with the enacted plan, does not have as dramatic a shift towards the Republicans at the statewide level in comparison to the House, we still see a number of cases of extreme packing and cracking at the individual cluster level. Without exceptions, the effect is to minimize the effect of the Democratic votes and make the outcome of the election insensitive to a wide range of swings in the partisan vote fraction.

In the NC Senate, we again see the effect of prioritizing municipal preservation in our ensemble. When municipal preservation was not prioritized, there are two major effects. First, the enacted maps become extreme outliers, as the typical results swings are much less tilted to the Republican Party. Second, the two parties are much less separated. Requiring a high level of municipal preservation often leads the separation of the two political parties between disjoint districts. This in turn produces maps that are much less responsive to swinging public opinion. In other words, the results of the elections do not change over a wider range of statewide vote ranges.

6.2.1 Iredell-Mecklenburg

In this cluster, the second most Republican district (District 41 in the enacted plan) is the principal district whose outcome varies from election to election. In the enacted plan, unusually few democrats have been placed in this district to maximize the chance that the district elects a Republican. See Figure 6.2.1. In many elections, this means that the Republican wins this district under the enacted plan, whereas a Democrat would win the district under the a majority of ensemble plans.

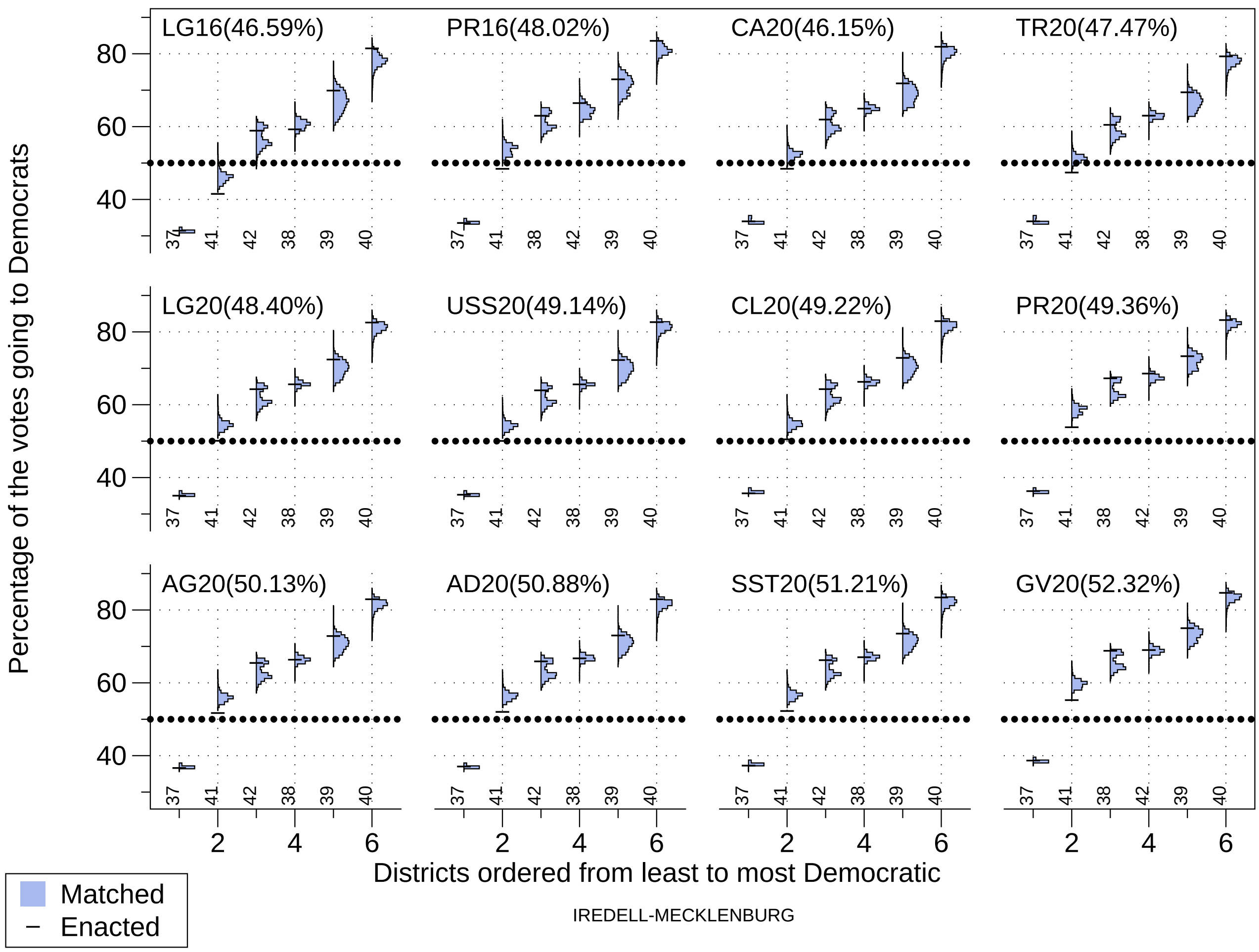


Figure 6.2.1: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

For each of the 2020 and 2016 elections we have consider, we found that none of approximately 80,000 plans in our ensemble had as low a fraction of Democrats in the two most Republican districts in the Iredell-Mecklenburg cluster as the enacted plan. Similarly, in the vast majority of the elections the ensemble had no plans with a higher fraction of democrats packed in the four most Democratic districts. In two elections 0.01% of the plans had a higher fraction of Democrats packed in the four most Democratic districts.

The effect discussed above is essentially the same when the municipality preservation is not prioritized. See Figure 6.2.2.

Municipal Splits and Ousted Population:

We see that in the Iredell-Mecklenburg cluster, the number of ousted people in the enacted plan is comparable the number of ousted people in the ensemble prioritizing municipalities. The enacted plan splits two municipalities which coincides with the most typical number split by the ensemble prioritizing municipalities. Though this ensemble sometimes splits a number more municipalities, it typically displaces a comparable number of people to the enacted plan.

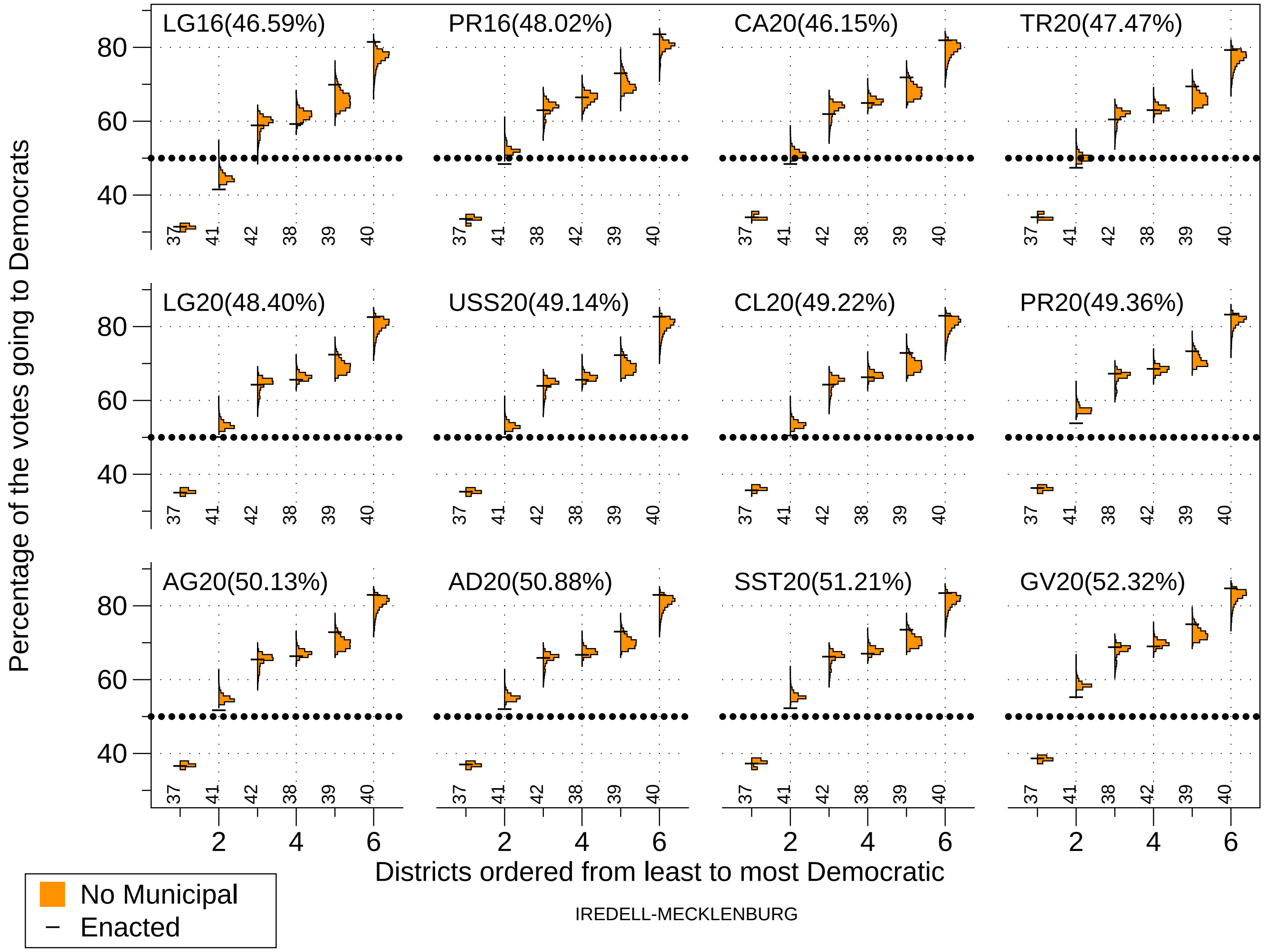


Figure 6.2.2: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the NC Senate Secondary ensemble which does not explicitly preserves municipalities.

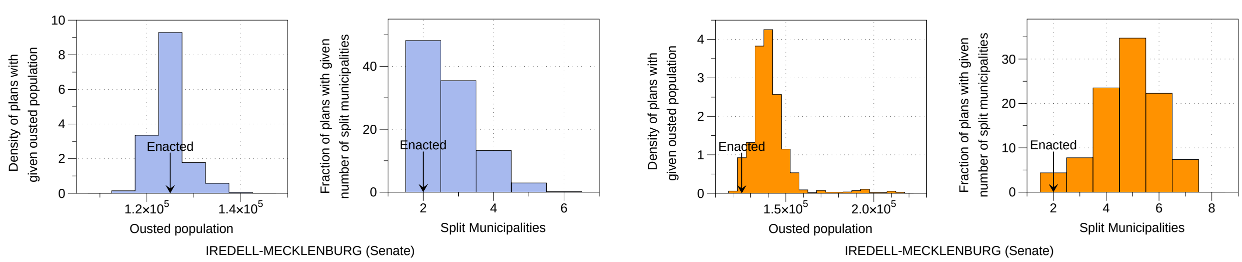


Figure 6.2.3: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.2.2 Granville-Wake

The enacted plan is chosen to be at the extreme edge of the ensemble. It maximizes the chance of the Republicans winning Districts 17 and 18 by packing a larger than typical number of Democrats in districts 14, 15, 16, and 18. The effect is shown in Figure 6.2.4 across the 12 elections. For each of the 2020 and 2016 elections we have consider, we found that none of

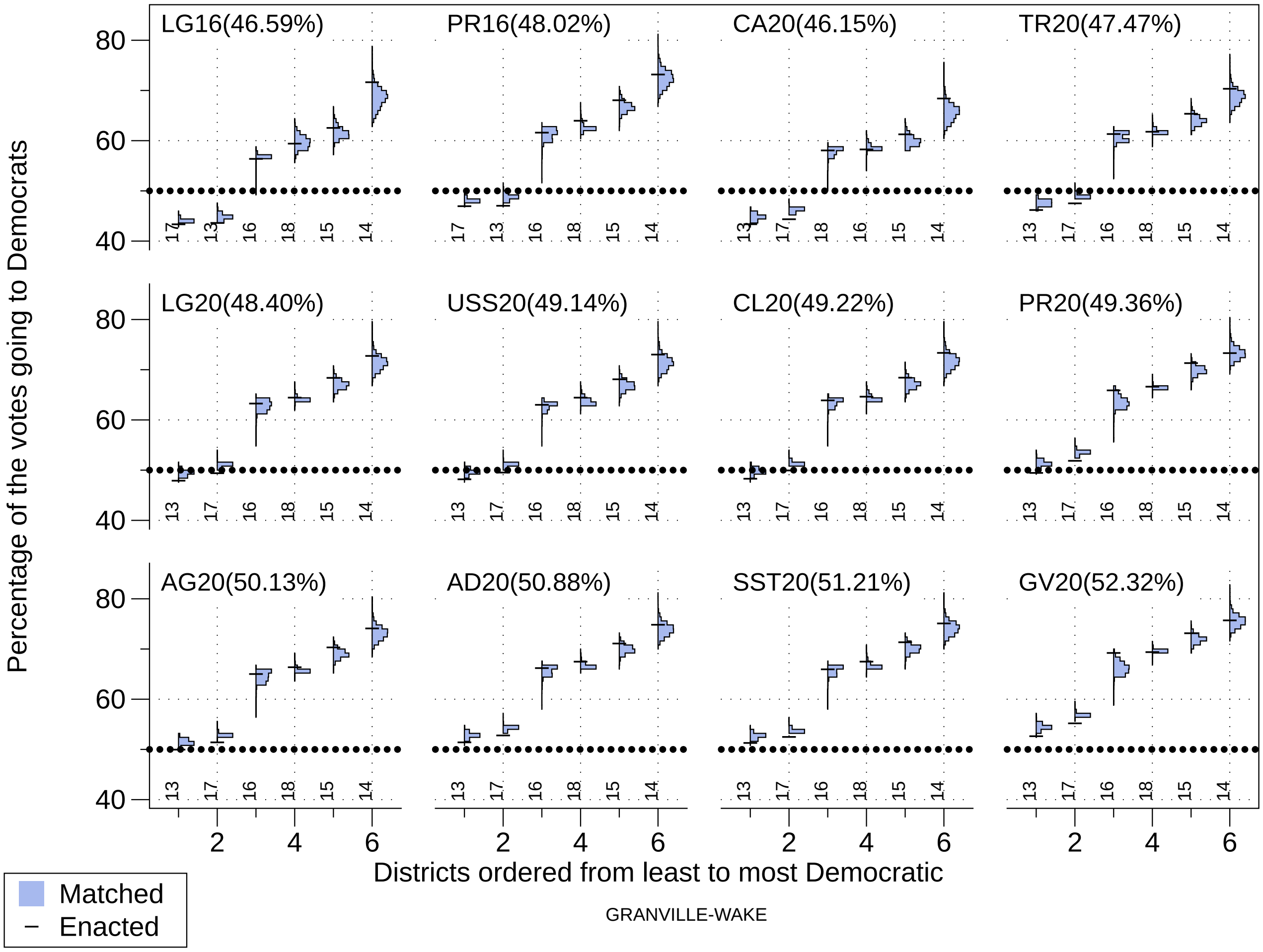


Figure 6.2.4: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

approximately 40,000 plans in our ensemble had as low a fraction of Democrats in the two most Republican districts in the Granville-Wake cluster as the enacted plan. Similarly, in six of the elections, the ensemble has no plans with more democrats packed in the four most Democratic districts. In six elections at most 0.022% of the plans had a higher fraction of Democrats packed in the four most Democratic districts than the enacted plan.

In this cluster, the prioritization of municipal preservation has a dramatic effect of packing Democrats in four districts and Republicans into two districts. The effect is show in Figure 6.2.5 across the 12 elections.

Municipal Splits and Ousted Population:

We see that in the Granville-Wake cluster, the number of ousted people in the enacted plan is significantly more than the number of ousted people in the ensemble prioritizing municipalities. The enacted plan splits three municipalities which coincides with the most typical number split by the ensemble prioritizing municipalities. Though this ensemble sometimes splits a number more municipalities, it typically displaces significantly fewer people than the enacted plan. From the perspective of the number of people ousted, the enacted plan is situated squarely between our ensemble prioritizing municipal preservation and that which does not.

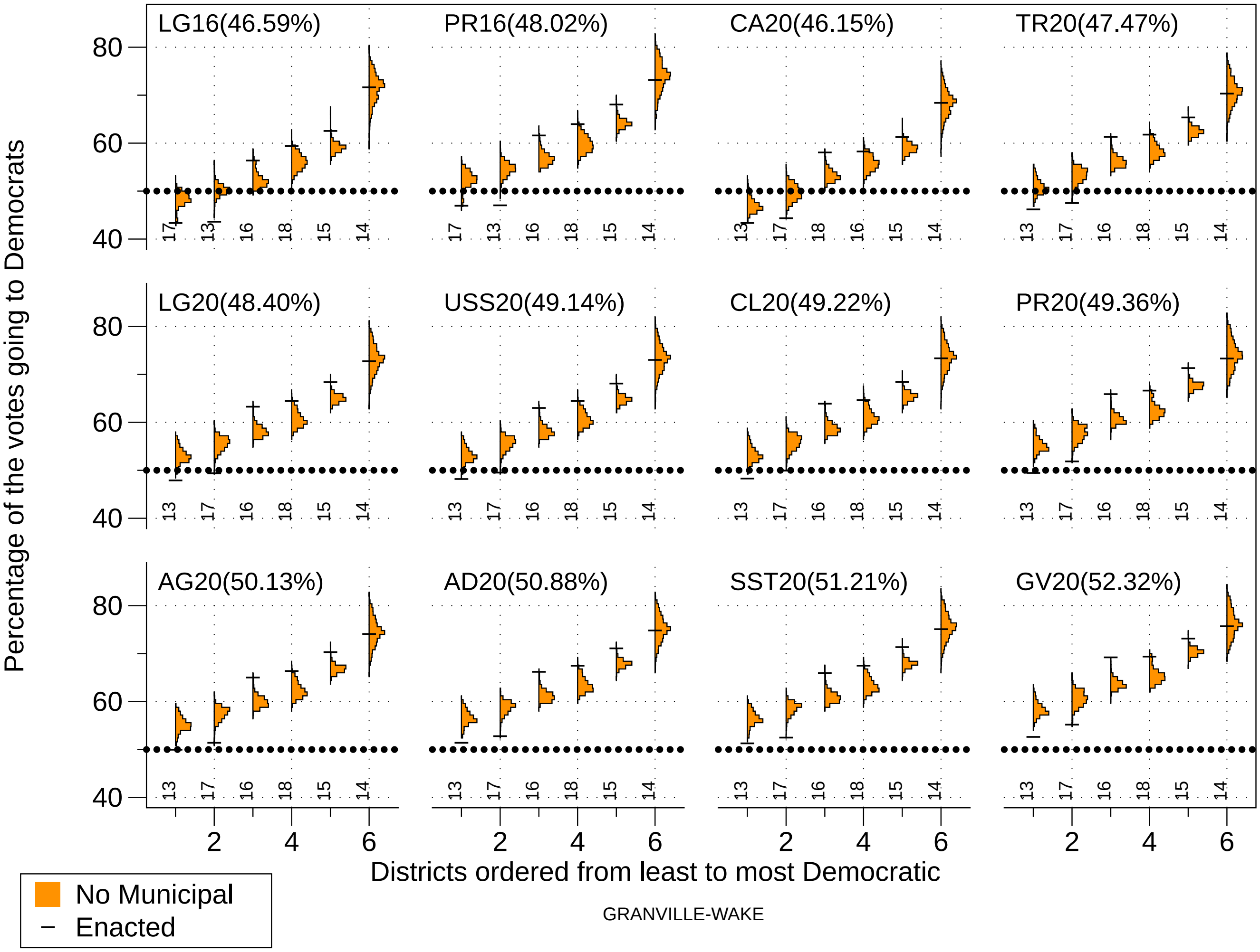


Figure 6.2.5: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the NC Senate Secondary ensemble which does not explicitly preserves municipalities.

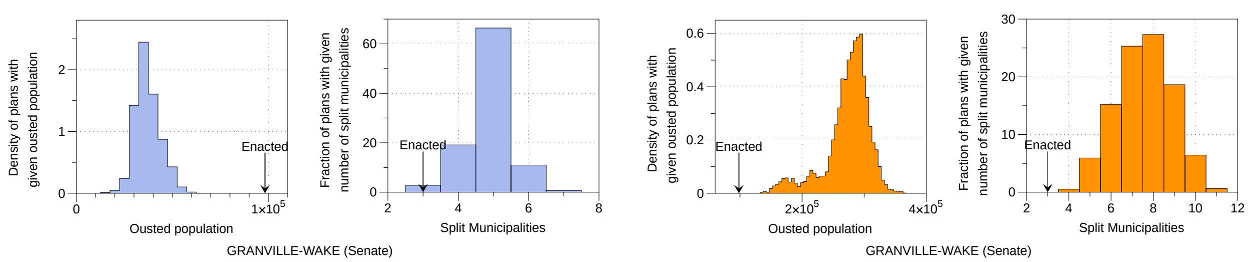


Figure 6.2.6: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.2.3 Forsyth-Stokes

There are only two districts in this cluster. The districts in the enacted plan are chosen to maximize the number of Democrats in the more democratic district and the number of republicans in the most Republican district. The map is an extreme outlier in both of these regards. The effect is a maximally non-responsive map. The effect is shown in Figure 6.2.7 across the 12 elections. Of the almost 80,000 maps in the ensemble, less than 1% had as low a fraction of Democrats in the most

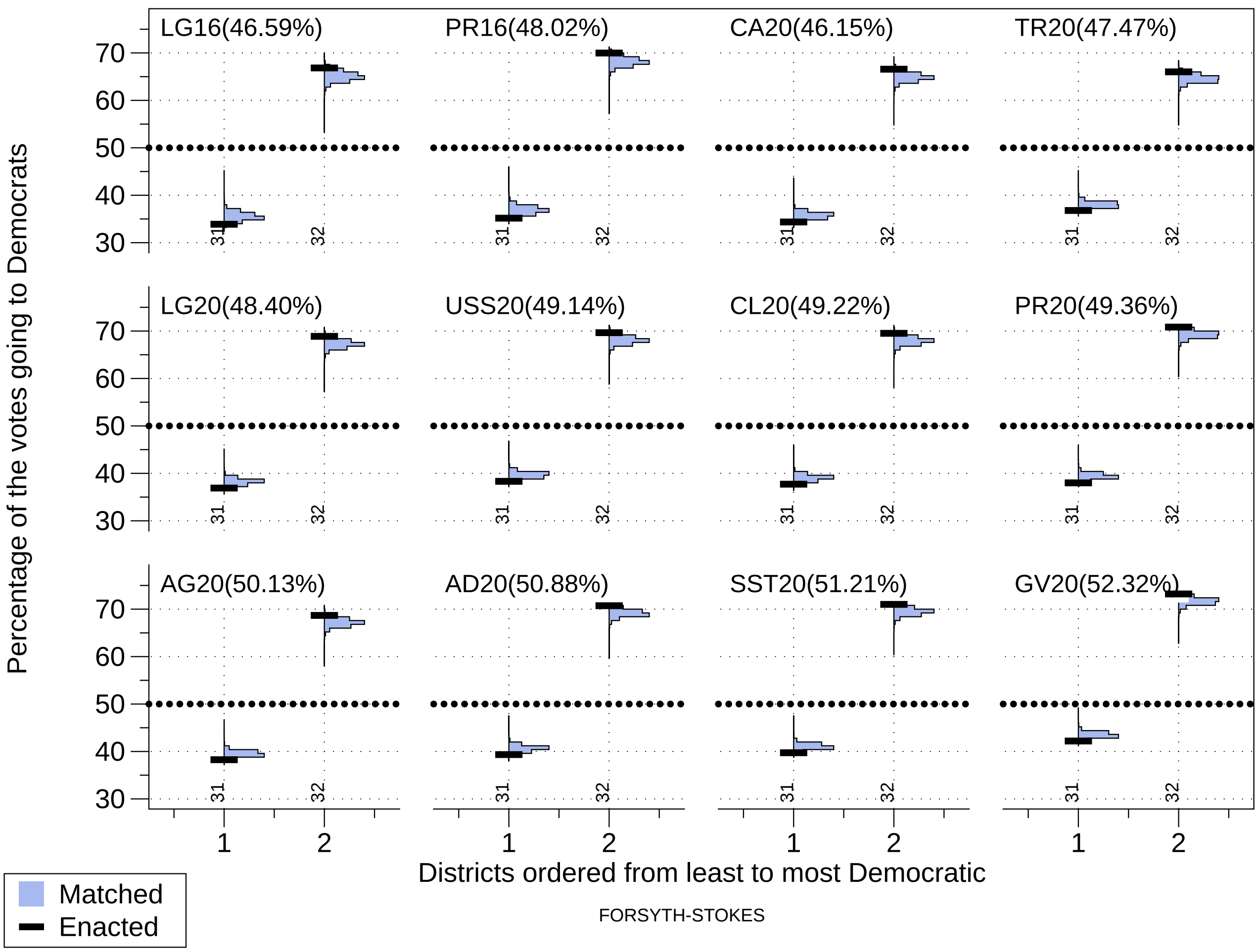


Figure 6.2.7: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

Republican district under the 2020 and 2016 elections considered. And between 1% and 5% of the plans had such a high Democratic fraction in the most Republican District.

When municipal preservation is not prioritized, the enacted map becomes an even more extreme outlier; showing an extreme level of packing of Democrats into one district and Republicans into the other. The effect is shown in Figure 6.2.8 across the 12 elections.

Municipal Splits and Ousted Population: In the Forsyth-Stokes Cluster we see that the number of people ousted from municipalities is comparable between the enacted plan and the municipality prioritizing ensemble. Additionally, the enacted plan splits one municipality which is the most common number of splits in the municipality prioritizing ensemble.

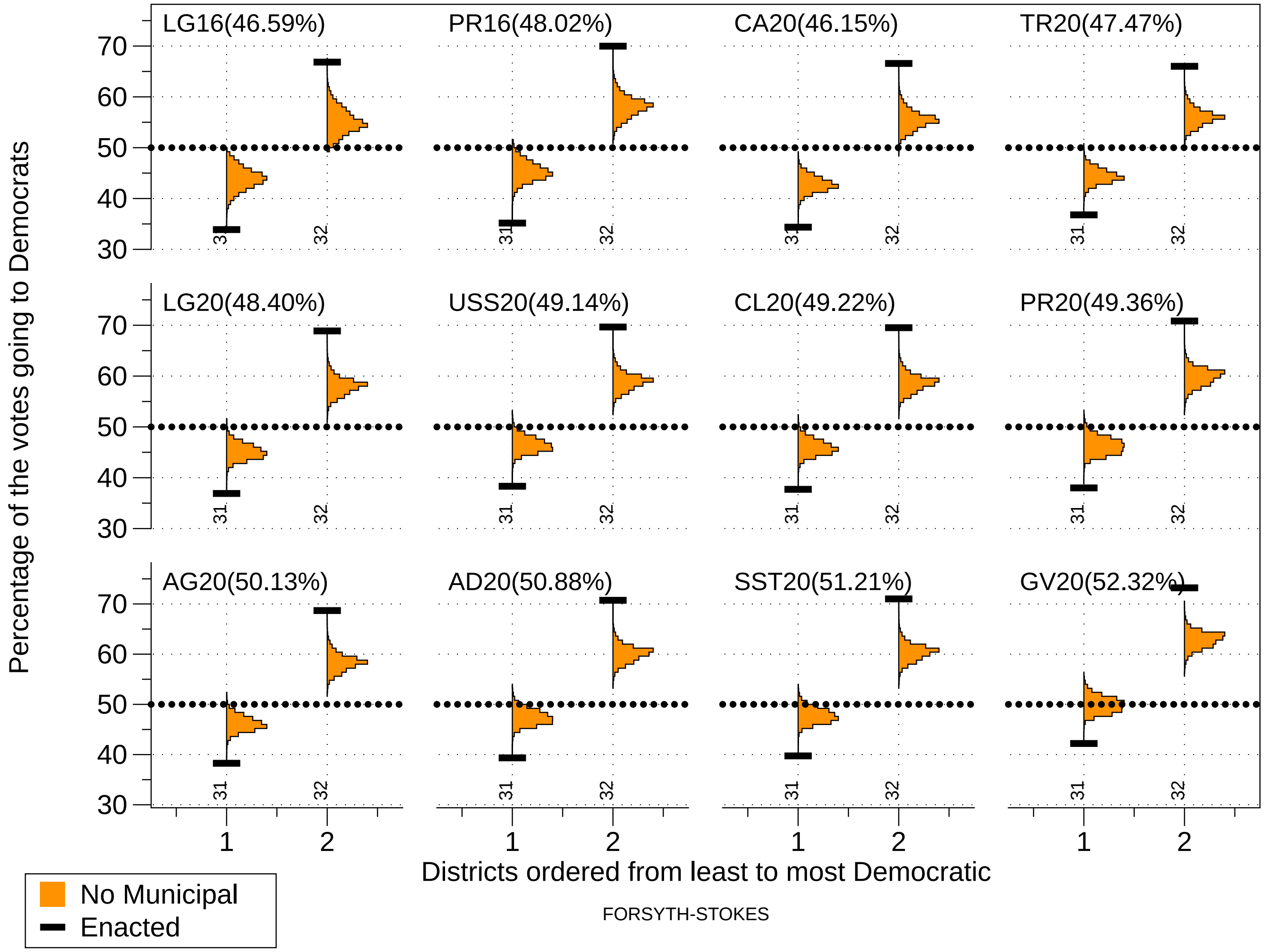


Figure 6.2.8: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the NC Senate Secondary ensemble which does not explicitly preserves municipalities.

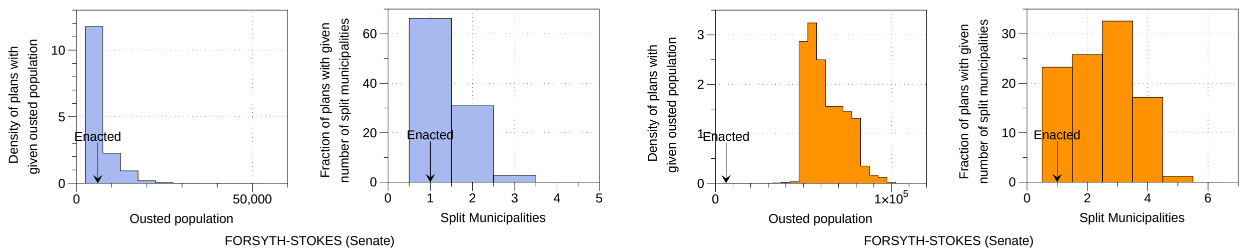


Figure 6.2.9: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.2.4 Cumberland-Moore

There are only two districts in this cluster. The districts in the enacted are chosen to maximize the number of Democrats in the more democratic district and the number of republicans in the most Republican district. The map is an extreme outlier in both of these regards. The effect is a maximally non-responsive map. The effect is shown in Figure 6.2.10 across the 12 elections. In each of the elections considered, no more than 0.06% of the ensemble plans have a lower fraction of Democrats

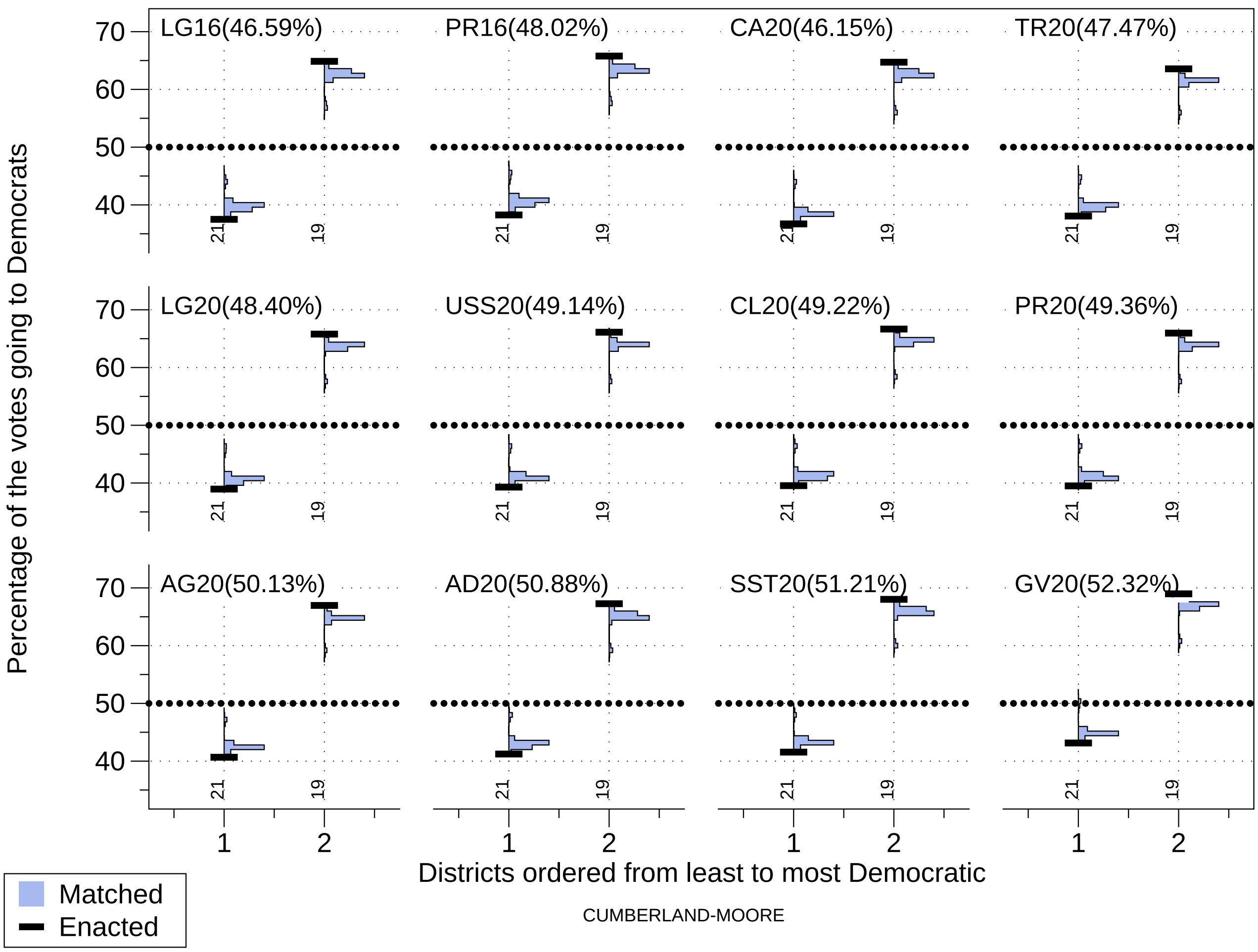


Figure 6.2.10: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

in the most Republican districts. Also no more than 0.06% of the ensemble plans have a higher fraction of Democrats in the most Democratic districts.

The prioritization of municipal preservation leads a dramatically less responsive pair of districts. When municipalities are less prioritized, both district have politically more centrist make up. Additionally, the more Republican district would regularly lean democratic without the prioritization of municipal preservation. The effect is show in Figure 6.2.11 across the 12 elections.

Municipal Splits and Ousted Population: In the Cumberland-Moore cluster, the enacted plan ousts a number of people close to the minimum number of ousted people seen in the ensemble prioritization municipal preservation. The enacted plan splits two municipalities which is the most common number of splits found in the ensemble prioritization municipal preservation.

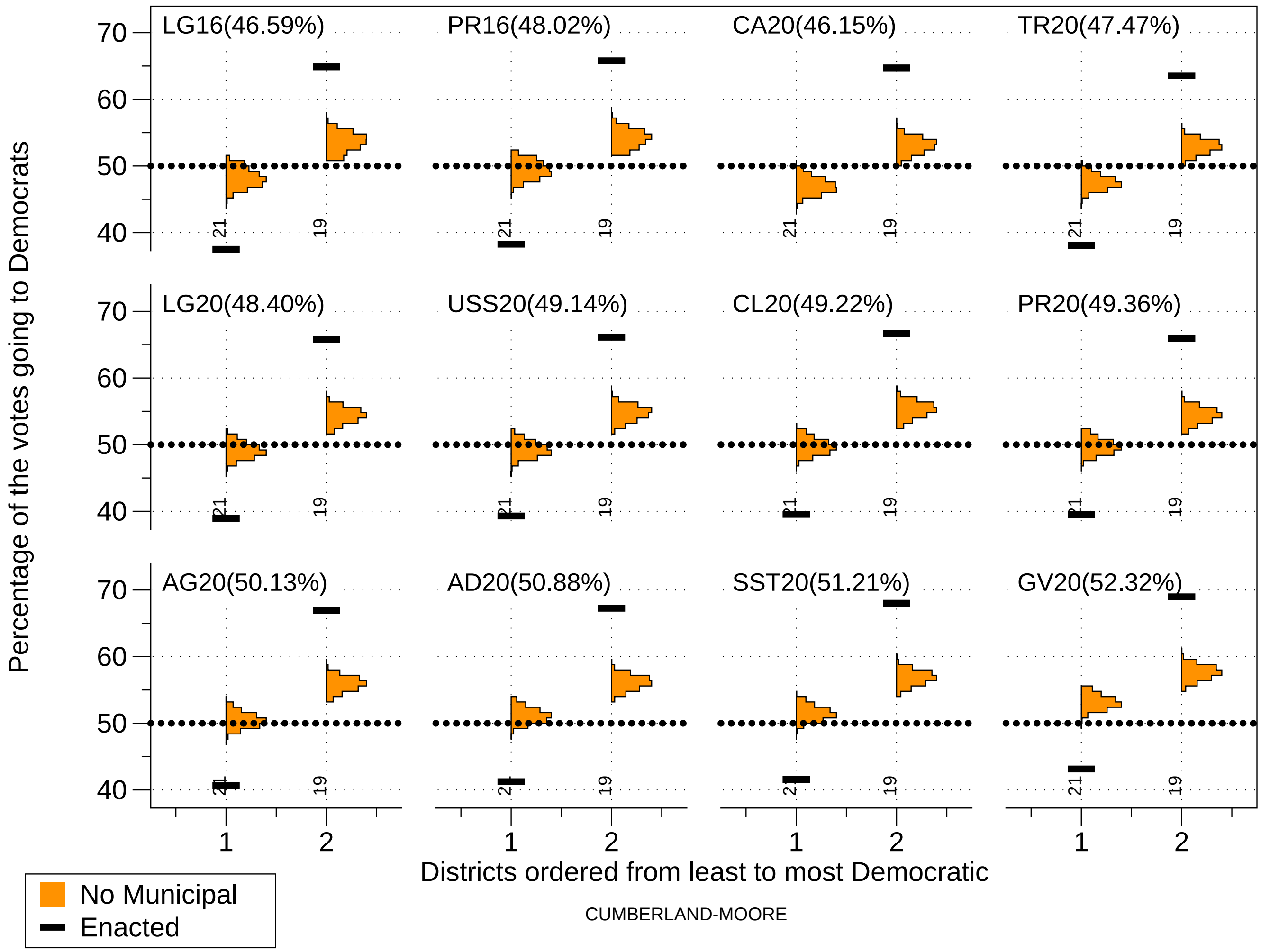


Figure 6.2.11: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the NC Senate Secondary ensemble which does not explicitly preserves municipalities.

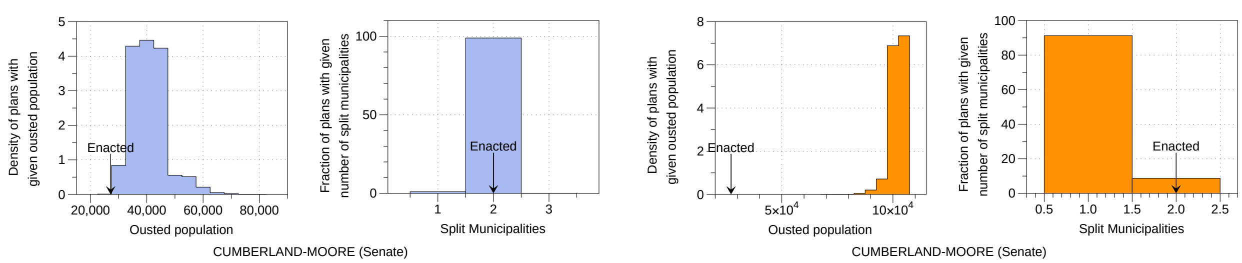


Figure 6.2.12: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.2.5 Guilford-Rockingham

The three districts in the Guilford-Rockingham cluster are constructed to pack an exceptional number of democrats in the most democratic district (district 28) and exceptionally few Democrats in the most Republican district (district 26). The effect is to ensure a Republican victory in the district 26, when in some elections the most republican district would be at risk of going to the Democratic Party. The effect is shown in Figure 6.2.13 across the 12 elections. In the Guilford-Rockingham

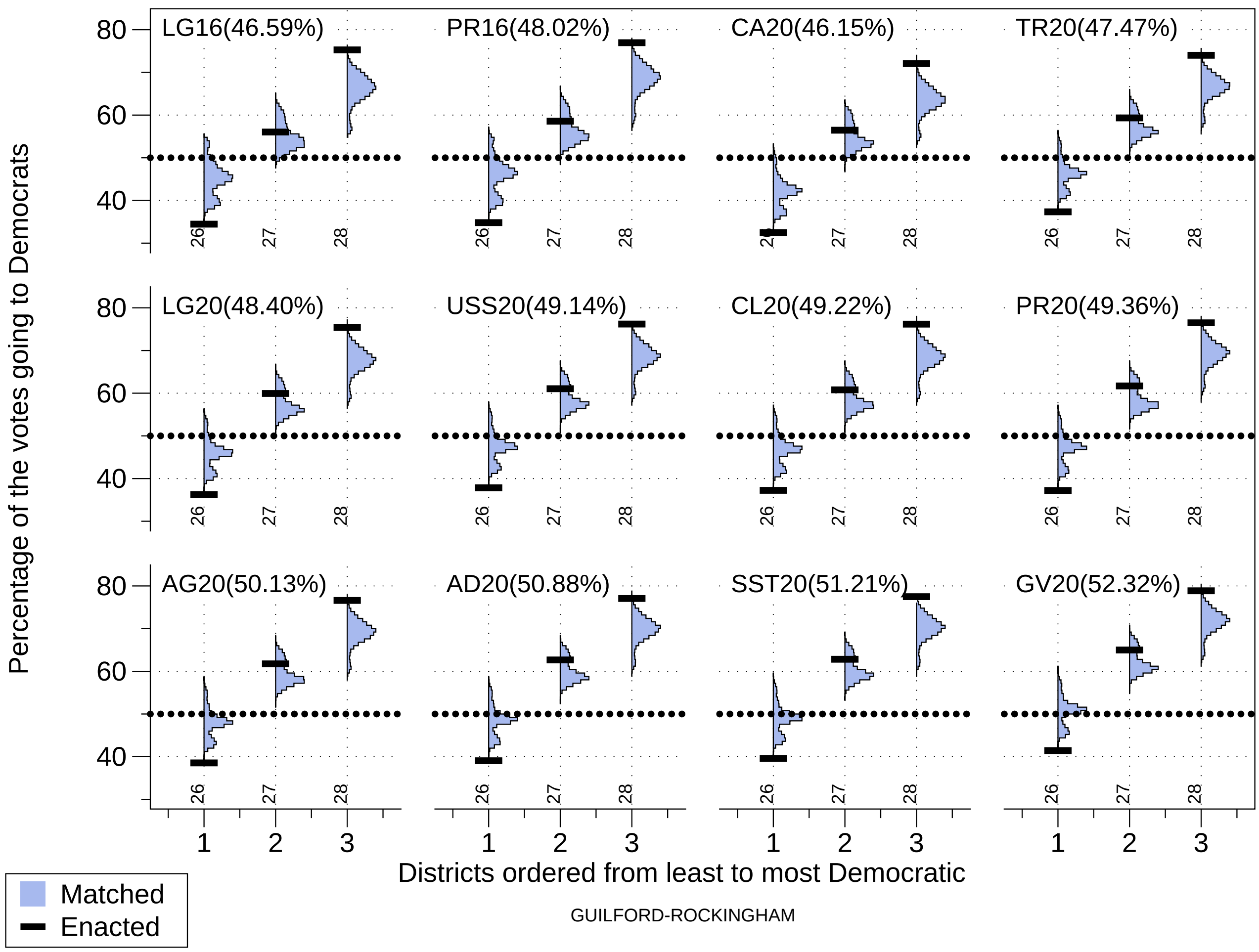


Figure 6.2.13: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the Primary ensemble which was tuned to match the municipal preservation of the enacted plan.

across all of the elections considered, none of the plans have lower fraction of Democrats in the most Republican district than the enacted plan. Conversely, in none of the elections considered do more than 0.08% of the plans have more Democrats packed in the most Democratic district than the enacted plan.

When municipalities are prioritized less, the effect is even more dramatic. In that setting, the extreme number of Democrats packed into the most democratic district and Republicans into the most Republican distinct is even more extreme. The effect is shown in Figure 6.2.14 across the 12 elections.

Municipal Splits and Ousted Population: In the Guilford-Rockingham cluster, the enacted plan splits one municipality and ousts a number of people which is typically found in the ensemble prioritizing municipality preservation which has an average ousted population which is slightly higher than the enacted plan.

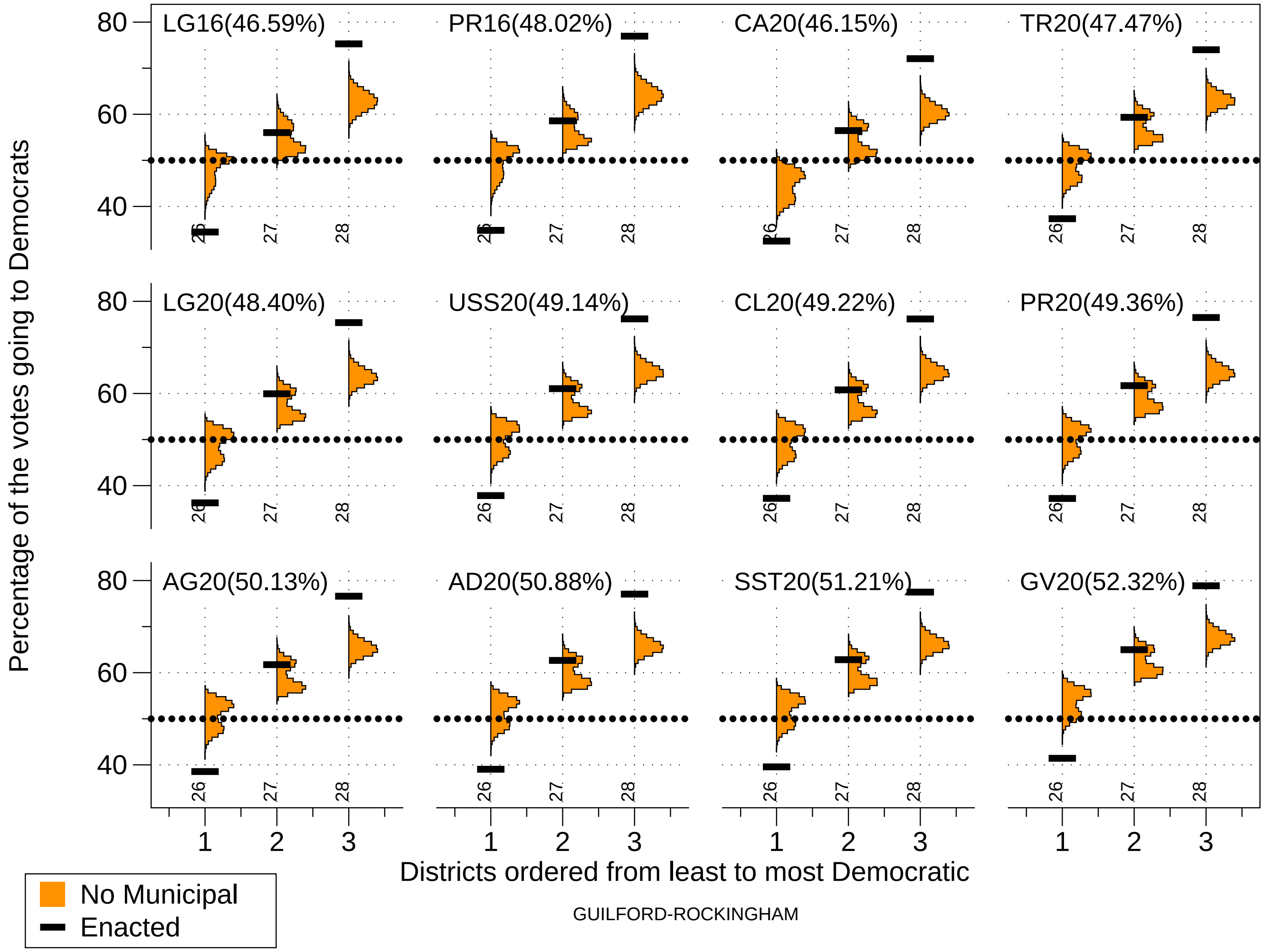


Figure 6.2.14: Shown are the distributions of the Democratic vote fraction of the districts in the plan when ordered from most Republican (on the left) to most Democrat (on the right). The " – " on each marginal histogram denotes the vote fraction of the corresponding district in the enacted plan. The numbers along the horizontal axis give the district numbers in the enacted plan corresponding to the " – ". This plot uses the NC Senate Secondary ensemble which does not explicitly preserves municipalities.

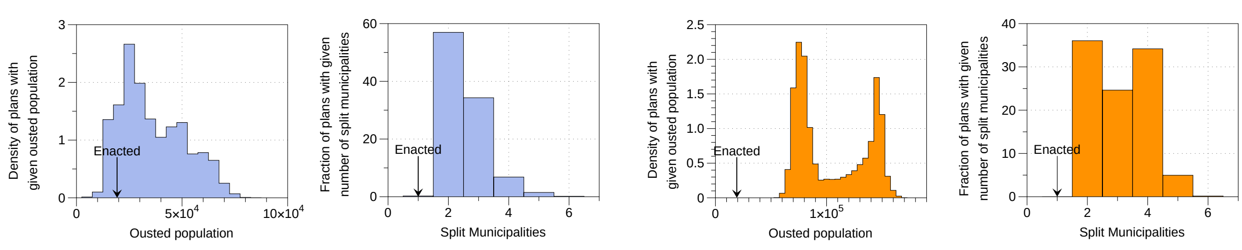


Figure 6.2.15: Plots showing the distribution of the number of people ousted from municipalities in this cluster under the primary and secondary ensemble. The amount of people ousted by the enacted map is also shown.

6.2.6 Northeastern County Cluster

In the NC Senate, there is more than one possible group of county clusters in the northeast corner of the state. As described in Figure 4.3.1 from Section 4.3, there is a choice between two different groups of county clusters. Each group consists of two different county clusters. Based on their population, each of these clusters has only one district. Thus, there is no choice on how to redistrict this region once the county grouping is set. We now explore partisan implications of choosing one county grouping over the other. As shown in the table below, under the enacted county groupings, Republicans win both districts in every election we consider. By contrast, under the alternative county grouping, each party won one of the two districts under every election we consider.

	Enacted Cluster 1	Enacted Cluster 2	Alternative Cluster 1	Alternative Cluster 2
County Clusters	Martin, Warren, Halifax, Hyde, Pamlico, Chowan, Washington, Carteret	Gates Currituck Pasquotank Dare Bertie Camden Perquimans Hertford Tyrrell Northampton	Pasquotank, Dare, Perquimans, Hyde, Pamlico, Chowan, Washington, Carteret	Gates, Currituck, Camden, Bertie, Warren, Halifax, Hertford, Tyrrell, Northampton, Martin
Democratic Vote %(LG16)	46.07%	47.74%	38.51%	55.42%
Democratic Vote % (PR16)	45.60%	46.70%	37.83%	54.59%
Democratic Vote % (CA20)	42.28%	44.47%	36.48%	50.75%
Democratic Vote % (USS20)	45.31%	45.36%	38.45%	52.75%
Democratic Vote % (TR20)	44.12%	44.58%	37.61%	51.59%
Democratic Vote % (GV20)	46.79%	47.56%	40.75%	54.12%
Democratic Vote % (AD20)	47.79%	47.72%	41.02%	54.99%
Democratic Vote % (SST20)	47.56%	47.85%	41.03%	54.89%
Democratic Vote % (AG20)	45.88%	46.11%	39.15%	53.40%
Democratic Vote % (PR20)	44.09%	45.54%	38.30%	51.84%
Democratic Vote % (LG20)	43.80%	45.12%	37.74%	51.69%
Democratic Vote % (CL20)	45.23%	46.42%	39.12%	52.00%

Table 3: Voting History for the two different choices of county grouping northeast corner in the NC Sente.

7 State Legislature: Additional Details

7.1 State Legislature: Details on the Sampling Method

To effectively generate a representative ensemble of maps from the desired non-partisan distributions, we use the well-established method of parallel tempering. It allows one to effectively sample from a possibly difficult to sample distribution by connecting it to an easy to sample distribution through a sequence of intermediate "interpolating" distributions.

We connect our desired distributions to a distribution on redistricting plans that favors plans with a larger number of spanning trees. This alternative distribution satisfies the same constraints, however, it does not consider compactness nor municipal preservation. We make this choice because it can be effectively sampled using a variation on the Metropolized Multiscale Forest RECOM sampling algorithm outlined in [1, 2] coupled with the Metropolis-Hasting algorithm. Using Parallel Tempering, we interpolate between the desired distribution on redistricting and a distribution which is chosen so that the Markov Chain Monte Carlo algorithm converges to its target distribution quickly.

In sampling the interpolating ladder of distributions between the easier-to-sample distribution and our target distribution with the needed policy considerations, we use parallel tempering with a classical Metropolis-Hasting sampling scheme to sample each level of the interpolating ladder of distributions. As proposals in the Metropolis-Hasting sampling scheme, we use a mixture of the Multiscale Forest RECOM proposals and single node flip proposals, depending on what is appropriate for the distribution associated with the given level in the interpolation. The Multiscale Forest RECOM has a number of advantages. Its multiscale nature seems to provide improvements in computational efficiency and the global moves of RECOM lead empirically to faster mixing. Additionally, it can efficiently preserve counties and other groupings. Lastly, it can be effectively combined with the Metropolis-Hasting algorithm to produce an algorithm that samples from the specified distribution.

To facilitate mixing and for computational practicality, we often split the interpolating groups of manageable size, typically between 10 and 30 interpolating levels. Each grouping is then run to produce an ensemble at the top level which approaches; which is closer to the desired ensemble. This ensemble is then used as an *independent sample reservoir* to generate independent samples for the next group of interpolating levels. This process is repeated until the desired level is reached. We typically use between 60 and 100 interpolating levels in our sampling schemes. The number of plans sampled differs from cluster to cluster. We also sometimes group clusters together for sampling. Usually the number of samples in around 80,000 but in all cases we have check various empirical measure to evaluate if the sampling has converged and is well mixed.

7.2 State Legislature: Mathematical Description of Ensemble Distribution

In designing our distributions, we have chosen to define explicit distributions and then use an implementation of the Metropolis-Hastings algorithm to generate the ensemble. We feel this choice promotes transparency because an explicit distribution can better be discussed and critiqued. It also allows us to more explicitly translate the policy considerations into the ensemble.

In order to formally define our distributions, we consider the labeling ξ of the precincts of the map of NC with the number $\{1, \ldots, d\}$, where d is the total number of districts. So for the i-th precinct, $\xi(i)$ gives the district to which the precinct belongs. If we let $A_j(\xi)$ and $B_j(\xi)$ be respectively the surface area and perimeter (or length of the boundary) of the j-district then our compactness score is

$$J_{\text{compact}}(\xi) = \sum_{j=1}^{d} \frac{A_j(\xi)}{B_j^2(\xi)}.$$

Then the probability of drawing the redistricting ξ is

$$\text{Prob}(\xi) = \begin{cases} \frac{1}{Z} e^{-w_{\text{compact}} J_{\text{compact}}(\xi)} & \text{for } \xi \text{ which is allowable} \\ 0 & \text{for } \xi \text{ which is not allowable} \end{cases}$$

Here Z is a number that makes the sum of Prob(ξ) over all redistricting plans are equal to one.

The collection of allowable redistricting plans ξ is defined to be all redistricting plans which satisfy the following conditions:

1. all districts are connected
2. the populations of each district is within %5 of the ideal district population unless the district in the wake county cluster in the senate or the Craven-Carteret county cluster in the house.[2]
3. The number of split counties is minimized.
4. We minimize the occurrence of districts traversing county boundaries.

The second distribution includes a municipality score, $J_{MCD}(\xi)$. This score describes the number of people who have been displaced from a district that could have preserved the voters within their municipality, and is defined as

$$J_{MCD}(\xi) = \sum_{m \in M} \text{pop}_{oust}(\xi, m),$$

where M is the set of all MCDs, and $\text{pop}_{\text{oust}}(\xi, m)$ is the number of displaced people from the municipality m under the redistricting plan ξ. We define pop_{oust} in one way if the population of the municipality is less than the size of a district and another if it is greater.

[2]In the two exceptional clusters, it is impossible to draw districts that preserve precincts and also achieve population balance within 5%. For Wake in the senate, we sample with a deviation of 6% and generate an associated ensemble; past experience has shown that this does not create a partisan effect and we will be confirming this in follow on analyses. In Craven-Carteret, precinct 02 in Craven is the only precinct that connects the bulk of Craven with Carteret and it must be split to achieve population balance between the two districts within this cluster. We have examined the voting patterns when assigning this precinct to the district with the bulk of Craven or with all of Carteret and found minimal effects on the outcome.

If m has a population that is less than the population of a district, we consider the district that holds the most people from the municipality m as the representative district for that municipality. Any person within municipality m, but not within the representative district is considered to have been displaced.

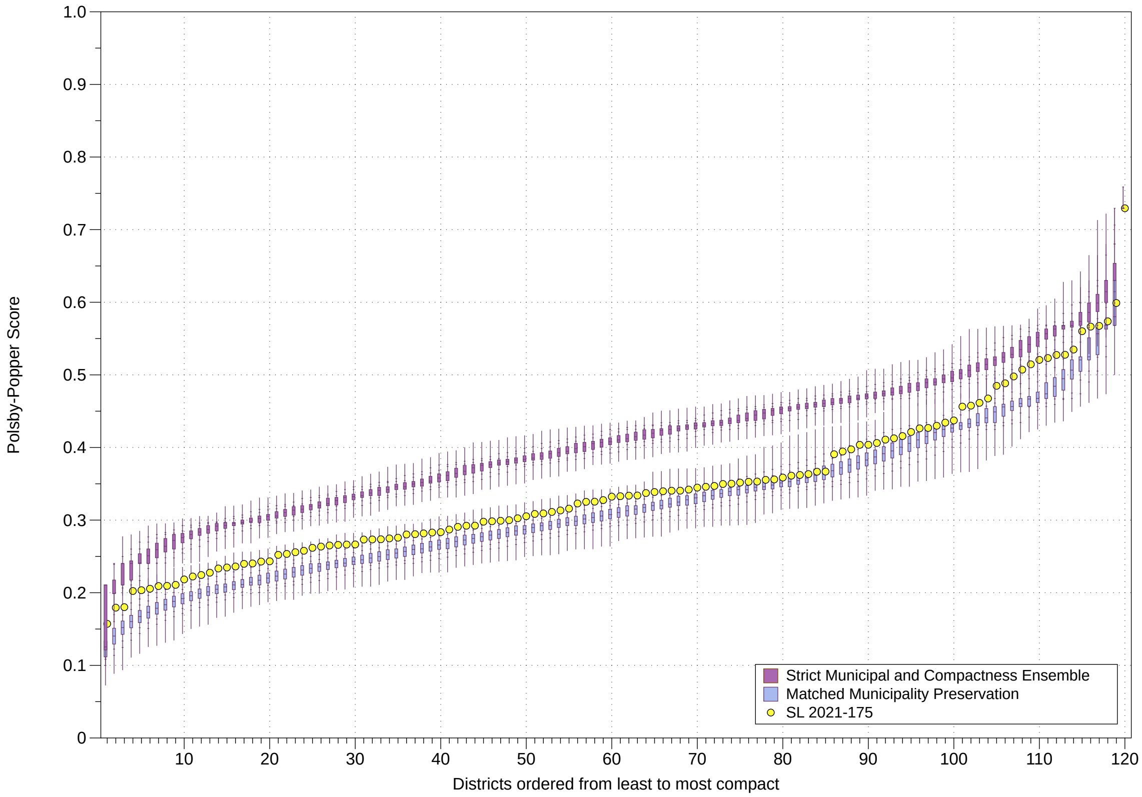
If m has a population that is greater than the population of a district, we consider the number of districts that could fit within m to be $d(m) = \lfloor \text{pop}(m)/\text{pop}_{\text{ideal}} \rfloor$, where $\text{pop}(m)$ is the population of the MCD m and $\text{pop}_{\text{ideal}}$ is the ideal district population. We also consider the remaining population in the municipality that cannot fit within a whole district to be $r(m) = \text{pop}(m) - d(m) \times \text{pop}_{\text{ideal}}$. To determine the displaced population, we look at the $d(m)$ districts that contain the largest populations from the municipality m. Hypothetically, everyone in these districts could live in the municipality m. Therefore, anyone who is in one of these districts and that does not live in the municipality m could be replaced by someone who does live in the municipality. Thus, we sum the number of people not in m in the $d(m)$ districts that contain the largest populations of m. We also note that the remaining population $r(m)$ could hypothetically be kept intact when drawing a $(d(m) + 1)$th district. We, therefore, look at the number of people in the municipality m who are living in the district with the $(d(m) + 1)$th most population of the municipality. If the number of people in m is less than $r(m)$, then we add this difference to the number of ousted people (since each of these people in the municipality could have conceivably been placed in the district).

Formally, we let the $|M| \times d$ matrix, $MCD(\xi)_{m,j}$ represent the number of people who are in the municipality m and the district ξ_j. Then

$$\text{pop}_{\text{oust}}(\xi, m) \begin{cases} \sum_j MCD(\xi)_{m,j} - \max_j(MCD(\xi)_{m,j}) & \text{pop}(m) < \text{pop}_{\text{ideal}} \\ \sum_{j \in D(m)}(\text{pop}(\xi_j) - MCD(\xi)_{m,j}(\xi)) & \text{pop}(m) \geq \text{pop}_{\text{ideal}} \\ \quad + \max(0, MCD(\xi)_{m,N(m)} - r(m)) & \end{cases},$$

where $\text{pop}(\xi_j)$ is the population of district ξ_j, $D(m)$ is the set of district indices that represent the $d(m)$ districts with the largest populations of municipality m, and $N(m)$ represents the district index with the $d(m) + 1$ most population of municipality m.

7.3 State Legislature: Additional Ensemble Statistics



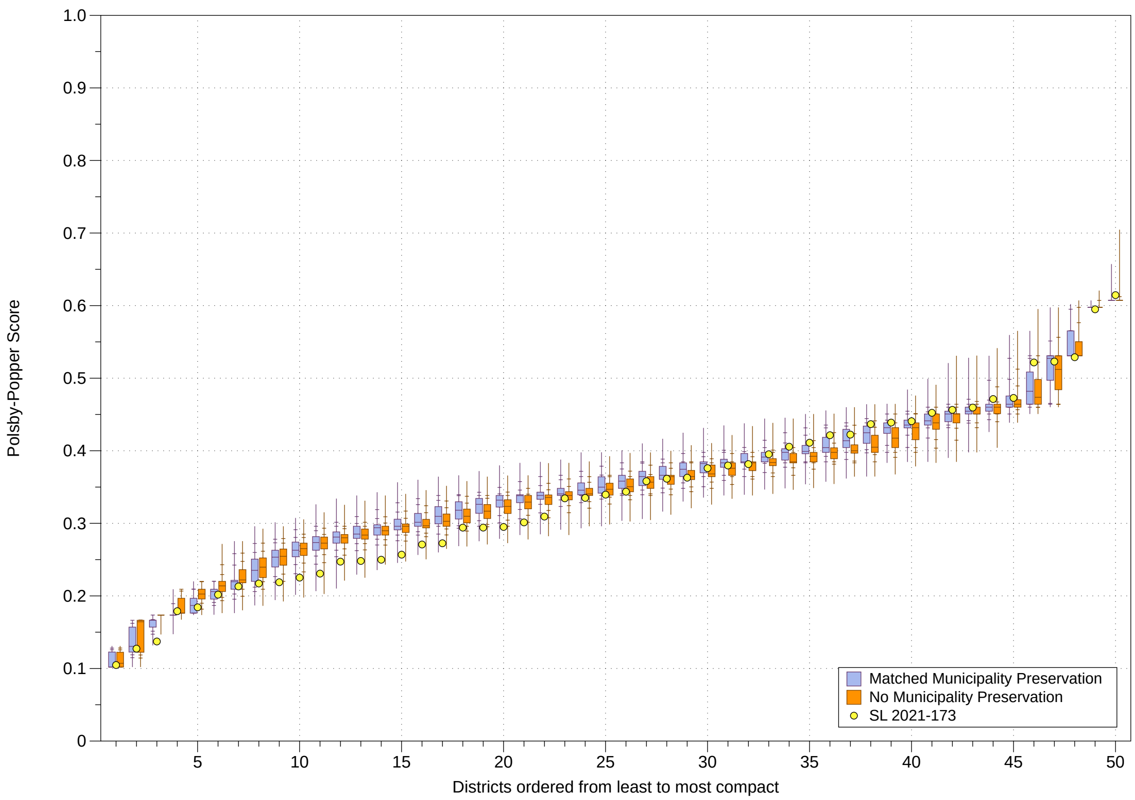


Figure 7.3.1: These plots compare the Polsby-Popper Score of the enacted maps (shown we the yellow dots) with the marginal histograms of the primary and secondary ensembles.

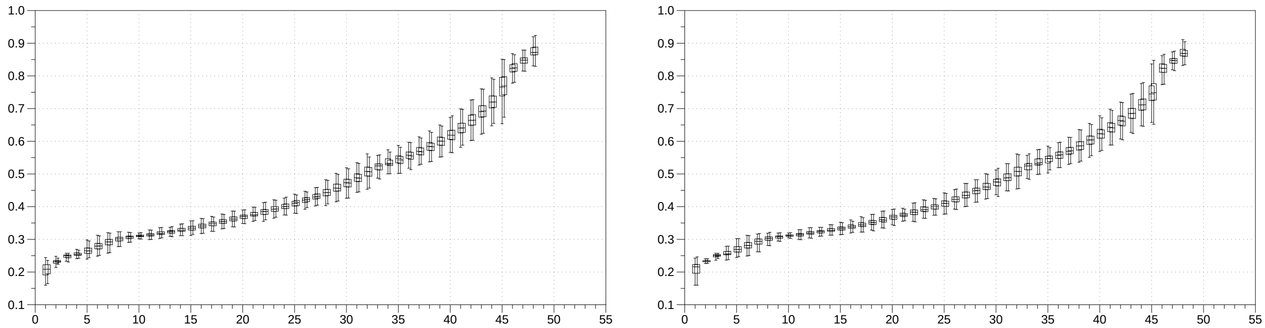


Figure 7.4.1: We compare a subset of the threads to the remaining threads. Each thread represents a different initial condition, and thus takes a different trajectory through the phase space. We compare our standard observables, such as the ranked ordered marginal distributions and confirm that they yield equivalent results. On the left we show an example of comparing one thread with all threads in a parallel tempering run; on the right we show an example of comparing half of the thread with the other half of the threads in a parallel tempering run.

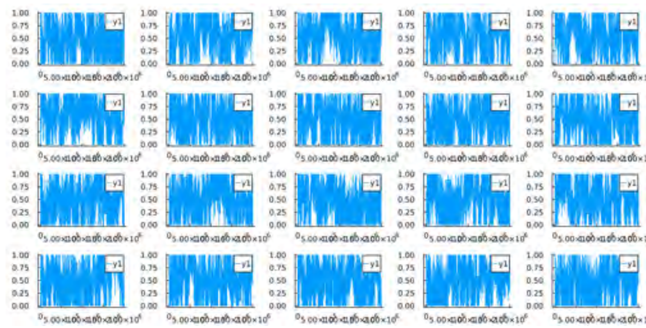


Figure 7.4.2: We examine how each of the parallel tempering threads swaps as a function of the proposal number. The vertical axis represents different measures and the horizontal axis represents the proposal in the Markov Chain. When the thread (or redistricting) is near the bottom of the vertical axis it mixes quickly when drawing from the reservoir; when it is at the top of the vertical axis it is at the desired measure which is either the desired measure we are sampling from or an intermediate measure that will act as a subsequent reservoir.

7.4 State Legislature: Convergence Tests

We performed a number of tests to assess if our sampling of the desired distribution was sufficient to provide an accurate representation of the desired distribution. Sometimes many samples are needed, yet in other cases a much smaller number is sufficient. We use a number of different methods to assess convergence.

Many of our runs were generated with an implementation of the *parallel tempering algorithm* with an *independent sample reservoir*. The use of parallel tempering provides a number of different threads that can be grouped and then compared against each other. As each thread starts from a different initial condition, if the distributions look similar then there is evidence that the system is mixing. Similarly, if a subset of the threads has a similar distribution to all of the threads, then there is evidence that enough samples were used.

The following plots show representative ranked ordered histograms for some NC House and NC Senate runs where different threads in a parallel tempering run are compared.

Each time a thread exchanges its state with the independent sample reservoir, it receives a new configuration that is independent of the previous state of the system. Additionally, if the thread then progresses up to the parameter level of interest, then we have strong evidence that we are producing decorated samples. The following plots show the current level of each for the different threads in a parallel tempering run. Switching regularly from the highest level (the desired sample distribution) to the lowest level (the level with the independent sample reservoir) is a strong indication that the system will be well mixed and converged.

In some cases, we run two or more complete sampling runs for the same target distribution. If the ensembles generated are close then we have strong evidence that the ensembles are converged as each run started from different initial conditions and used different randomness.

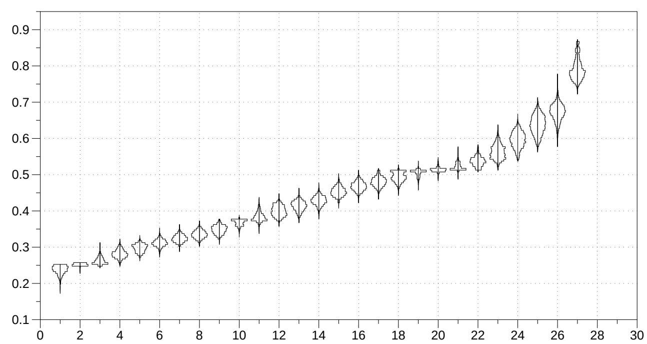


Figure 7.4.3: We compare the ranked ordered marginals on two independent parallel tempering runs.

8 Congressional Plan

As with the NC House and NC Senate plans, we place a probability distribution on Congressional plans for North Carolina. The distributions embody different policy choices. With each distribution, we produce representative ensembles of maps to serve as benchmarks against which to compare specific maps. The ensembles are generated by using the Metropolis-Hasting Markov Chain Monte Carlo Algorithm in a parallel tempering framework which employs the proposal from the Multiscale Forest RECOM algorithm [2, 1].

This analysis parallels the analysis already presented for the NC House and NC Senate with the simplification that we no longer need to consider County Clusters and that some of the criteria are modified. The details are given in Sections 8.1 and 7.2.

8.1 Congressional: Ensemble Overview

Similarly to the distribution placed on the NC Legislative redistricting plans in Section 4.4, we consider a distribution (and hence an ensemble) satisfying the following constraints:

- The maps split no more than 14 counties.
- The maps split no county into more than two districts.
- Districts traverse counties as few times as possible.
- All districts are required to consist of one contiguous region.
- The deviation of the total population in any district is within 1% of the ideal district population. We have verified in previous work in related settings that the small changes needed to make the districting plan have perfectly balanced populations do not change the results. (See [7] and the expert report in Common Cause v. Rucho).
- **Compactness**: The distributions on redistricting plans are constructed so that a plan with a larger total isoperimetric ratio is less likely than those with a lower total isoperimetric ratio. The total isoperimetric ratio of a redistricting plan is simply the sum of the isoperimetric ratios over each district. The isoperimetric ratio is the reciprocal of the Polsby-Poper score; hence, smaller isoperimetric ratio corresponds to larger Polsby-Poper scores. As the General Assembly stated in its guidance that the plans should be compact according to the Polsby-Popper score [9], we tuned the distribution so that it yields plans of a similar compactness to those of the legislature. (See Figure 10.2.1 in Section 10.2.) We further limited our distribution only to include those with an Isoparametric score less than 80.

  The legislature also listed the Reock score as another measure of compactness which one could consider. However, we have found Polsby-Popper/isoperimetric score to be a better measure when generating districts computationally. In our previous work, we have seen that this choice did not qualitatively change our conclusions (see [7] and the expert report in Common Cause v. Rucho).

8.2 Congressional Plan: Sampling Method

We have chosen the distribution from which to draw our ensemble to comply with the desired policy and legal considerations. It is well accepted that not all distributions on possible redistricting plans are equally easy to sample from.

As discussed in Section 7.1 to effectively generate a representative ensemble of maps from these distributions, we use the well-established method of parallel tempering. It allows one to effectively sample from a possibly difficult to sample distribution by connecting it to an easy to sample distribution through a sequence of intermediate "interpolating" distributions.

We connect our desired distributions, which includes a compactness score, to a measure on redistricting plans which is uniform on spanning forests which satisfy the population and county constants. Furthermore, the enacted plan can be effectively sampled using a variation on the Metropolized Multiscale Forest RECOM sampling algorithm outlined in [1, 2].

In sampling the interpolating ladder of distributions between the easier-to-sample measure and our target measure which includes a compactness score, we use parallel tempering with a classical Metropolis-Hasting sampling scheme to sample each level of the interpolating ladder of distributions. As proposals in the Metropolis-Hasting sampling scheme, we use Multiscale Forest RECOM proposals. We sample around 80,000 plans have confirmed that the distribution seems well mixed and than it has been sufficiently sampled to provide stable statistics.

8.3 Election Data Used in Analysis

The same historic elections and abbreviations were use to analyze the congressional plan and ensemble as were used for the NC legislative maps and ensemble. See Section 4.6.

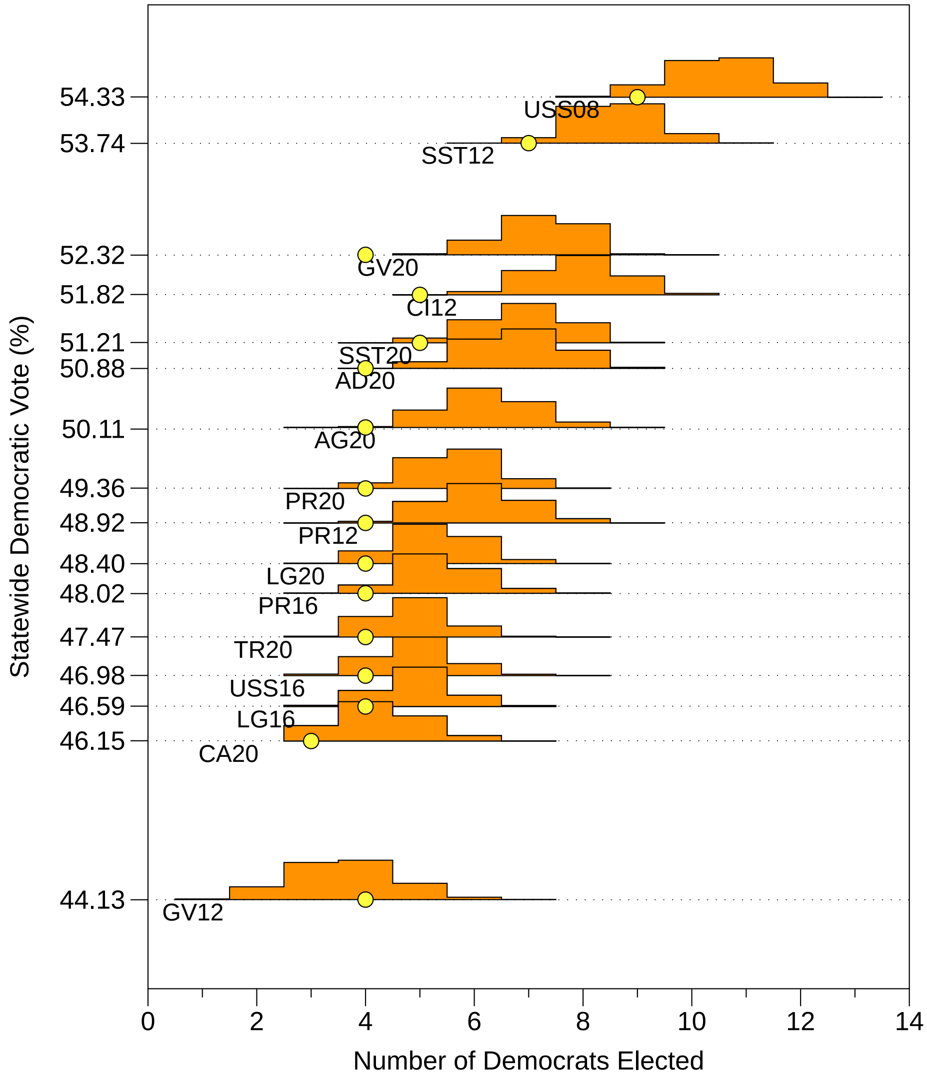


Figure 9.0.1: Each histogram represents the range and distribution of possible Democratic seats won in the ensemble of plans; the height is the relative probability of observing the result. The yellow dots represent the results from the enacted congressional plan under the various historic votes.

9 Congressional Plan: Main Analysis

Figure 9.0.1 gives the *Collected Seat Histograms* for the ensemble sampled from the distribution. This figure also shows how many Democrats the enacted congressional plan would have elected under the votes from a variety of historic elections.

Without reference to a particular ensemble, a primary message of this plot is that the enacted congressional plan is largely stuck electing 4 of 14 Democrats despite large shifts in the statewide vote fraction and across a variety of election structures. Over the statewide vote Democratic partisan vote range of 46.59% to 52.32%, the enacted map only twice changes the number of Republicans elected. The outcome of the election is largely stuck at 4 Democrats. This shows the enacted map to be highly non-responsive to the changing opinion of the electorate. Without holding the election one largely knows that the result will be 10 Republicans and 4 Democrats.

This non-responsiveness is not observed in the ensemble. The ensemle shows that a typical map drawn without political considerations gradually shift from 4-5 Democrats typically being elected at one end of this regime to 7-8 being elected at the other end. Hence, under historic elections in which Democrats win 46% to 53% of the statewide vote, a typical map would gradually shift from around 4 Democrats in the NC congressional delegation to around 8 Democrats as the electorate changed is vote. This does not happen under the enacted plan with the elections considered. Instead, as described above, the enacted map sticks at only 4 Democrats in North Carolina's congressional delegation under nearly all of these elections.

To better illuminate the structure responsible for making the enacted map an extreme outlier, we turn to the Rank Ordered Box plots already discussed in general in Section 3.4 and in the context of the state legislative maps in the previous sections. The plots show extreme packing of Democrats in the three most Democratic districts and depletion of Democrats from the

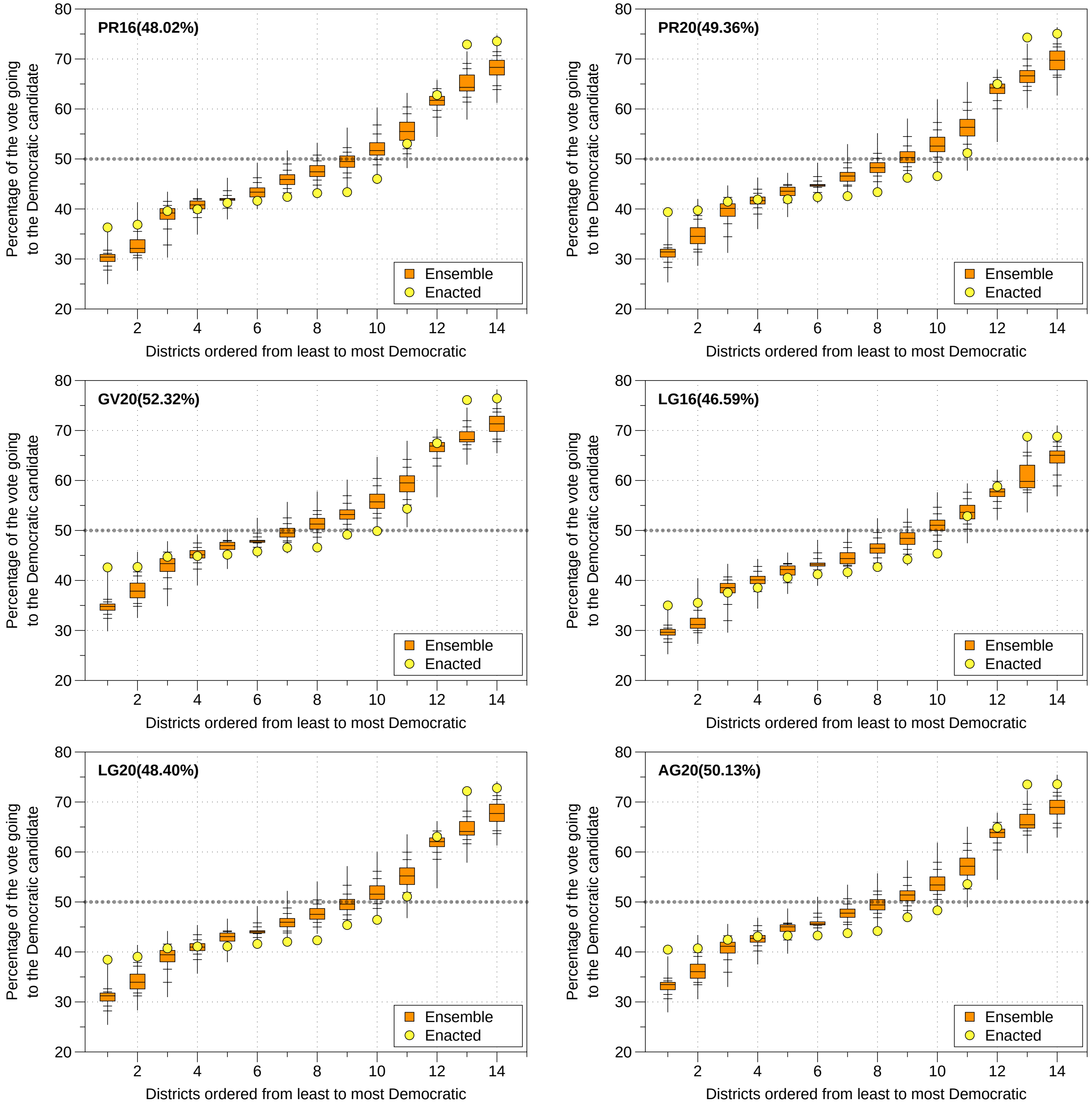


Figure 9.0.2: The Ranked Marginal Box-plots for the NC Congressional Plan. The ranked ordered marginals for the enacted map are shown in yellow. 50% of the ensemble is contained within the box. Inside the first pair of tick marks is 80% of the data and inside the second set is 95% of the points.

next 7 to 9 most Democratic districts. The effect of this cracking and packing is the non-responsiveness seen in Figure 9.0.1.

Motivated by the cracking and packing of Democrats shown in Figure 9.0.1, we ask how common is such a highly polarized districts in our non-partisan ensemble of maps. The results are summarized in Table 4. They show that the Congressional map is not only non-responsive to the changing preferences of the electorate but it is also an extreme partisan gerrymander. Maps which lock in such an extreme partisan outcome do not occur in our ensemble.

Election	Plans with the same or more Dem (1-2)	Plans with the same or more Rep (5-11)	Plans with the same or more Dem (12-14)	Total Plans
LG16	18	0	0	79997
PR16	0	0	0	79997
CA20	0	0	0	79997
TR20	0	0	0	79997
LG20	0	0	0	79997
USS20	0	0	0	79997
CL20	0	0	0	79997
PR20	0	0	0	79997
AG20	0	0	0	79997
AD20	0	0	0	79997
SST20	0	0	0	79997
GV20	0	0	0	79997
CI20	0	0	0	79997
USS16	0	0	0	79997
GV16	1	0	0	79997
AG16	15	0	0	79997

Table 4: Over the approximately 80,000 plans in our ensemble, we ask how many plans have (1) as high Democratic fraction in the two most Republican districts, (2) as small a fraction of Democrats in the 5th through 11th most Republican districts, and (3) have as high a Democratic fraction in the 12th through 14th most Republican districts. The answer is given in this table along with the total number of plans in our ensemble.

10 Congressional: Additional Details

10.1 Congressional Plan: Mathematical Description of Ensemble Distribution

In specifying our distribution, we have chosen to define explicit distributions and then use an implementation of the Metropolis-Hastings algorithm to generate the ensemble. We feel this choice promotes transparency because an explicit distribution can better be discussed and critiqued. It also allows us to more explicitly translate the policy considerations into the ensemble.

In order to formally define our distributions, the partition of the precinct adjacency graph into a spanning forest $\mathcal{T}$ with 14 district trees $\{\mathcal{T}_1, \cdots, \mathcal{T}_{14}\}$ corresponding to each district. Hence $\mathcal{T} = \{\mathcal{T}_1, \cdots, \mathcal{T}_{14}\}$ completely specifies the redistricting.

If we let $A_j(\mathcal{T})$ and $B_j(\mathcal{T})$ be respectively the surface area and perimeter (or length of the boundary) of the j-district then our compactness score is

$$J_{\text{compact}}(\mathcal{T}) = \sum_{j=1}^{14} \frac{A_j(\mathcal{T})}{B_j^2(\mathcal{T})}.$$

Then the probability of drawing the spanning forest $\mathcal{T}$ is

$$\text{Prob}(\mathcal{T}) = \begin{cases} \frac{1}{Z} e^{-w_{\text{compact}} J_{\text{compact}}(\mathcal{T})} & \text{for } \mathcal{T} \text{ which is allowable} \\ 0 & \text{for } \mathcal{T} \text{ which is not allowable} \end{cases}$$

Here Z is a number which makes the sum of Prob($\mathcal{T}$) over all spanning forests with 14 trees equal to one.

The collection of allowable spanning forests $\mathcal{T}$ is defined as those which produce redistricting plans which satisfy the following conditions:

1. all districts are connected
2. the populations of each district is within %1 of the ideal district population.
3. No more than 14 counties are split with no county split more once.
4. We minimize the occurrence of districts traversing county boundaries.

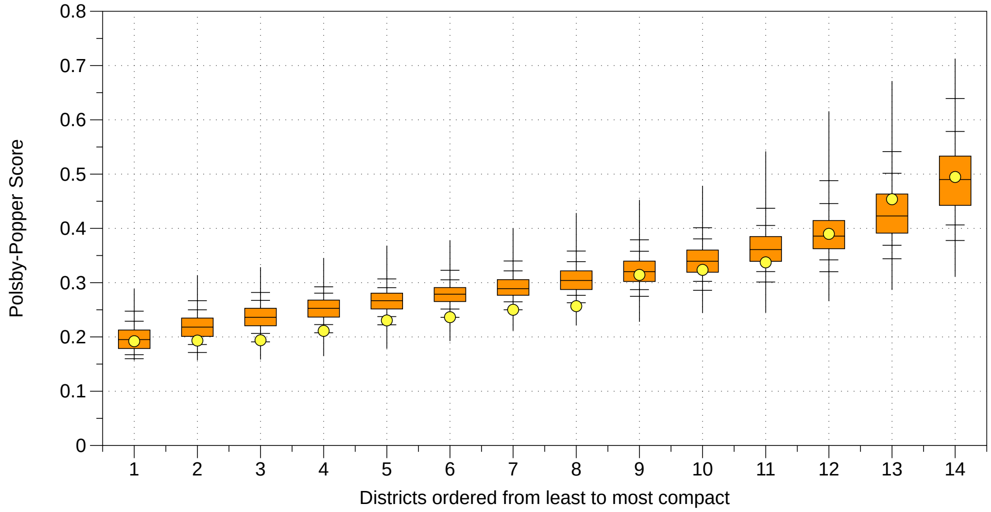


Figure 10.2.1: The yellow dots display the ordered Polsby-Popper score of the 14 districts in the enacted plan.

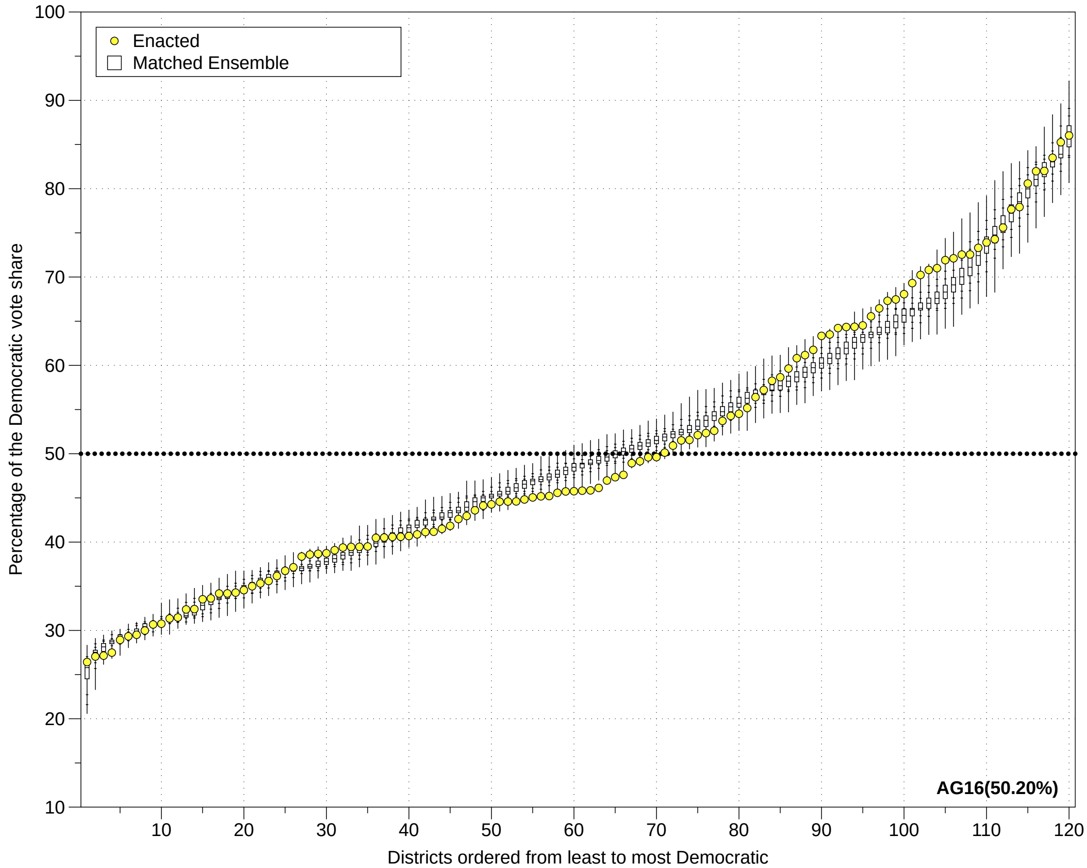
10.2 Congressional Plan: Additional Ensemble Statistics

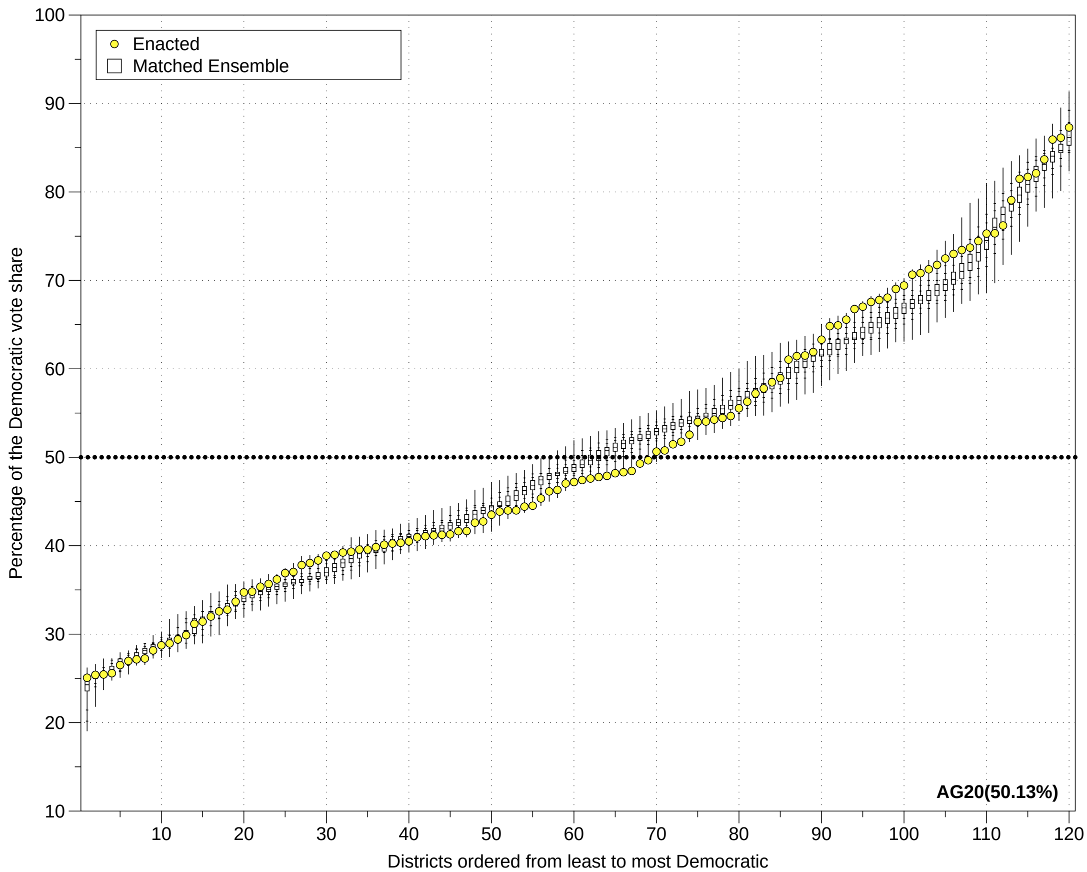
In Figure 10.2.1, we give the box-plots for the ranked ordered marginal distribution for the compactness score, namely the Polsby-Popper score (see companion methods document). We compare the ensemble of plans with the enacted plan.

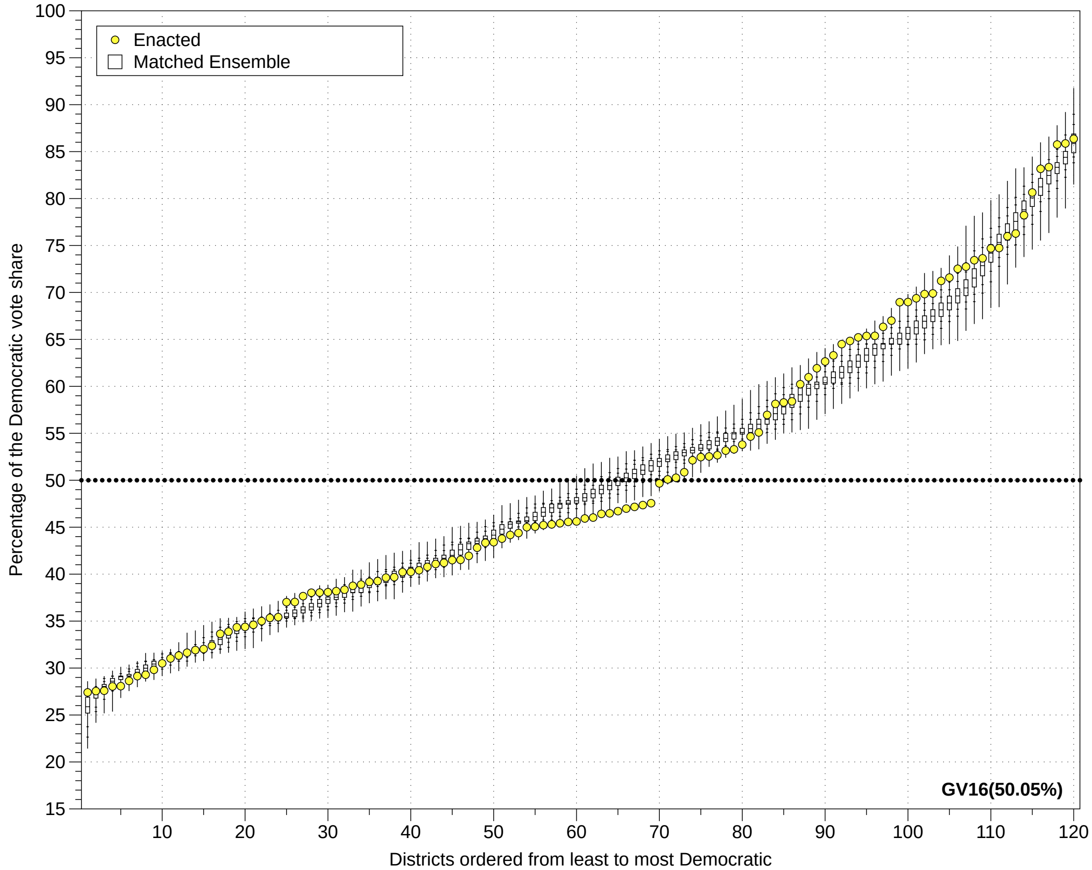
10.3 Congressional Plan: Convergence Tests

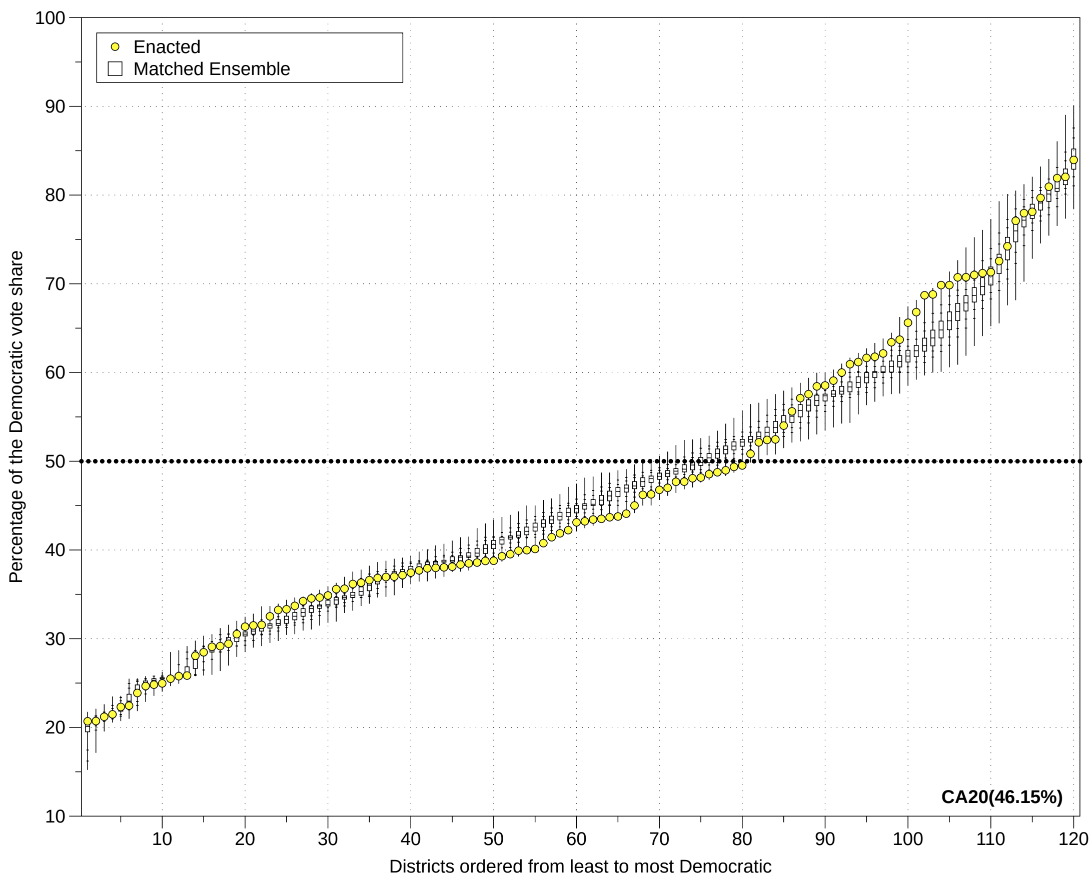
,

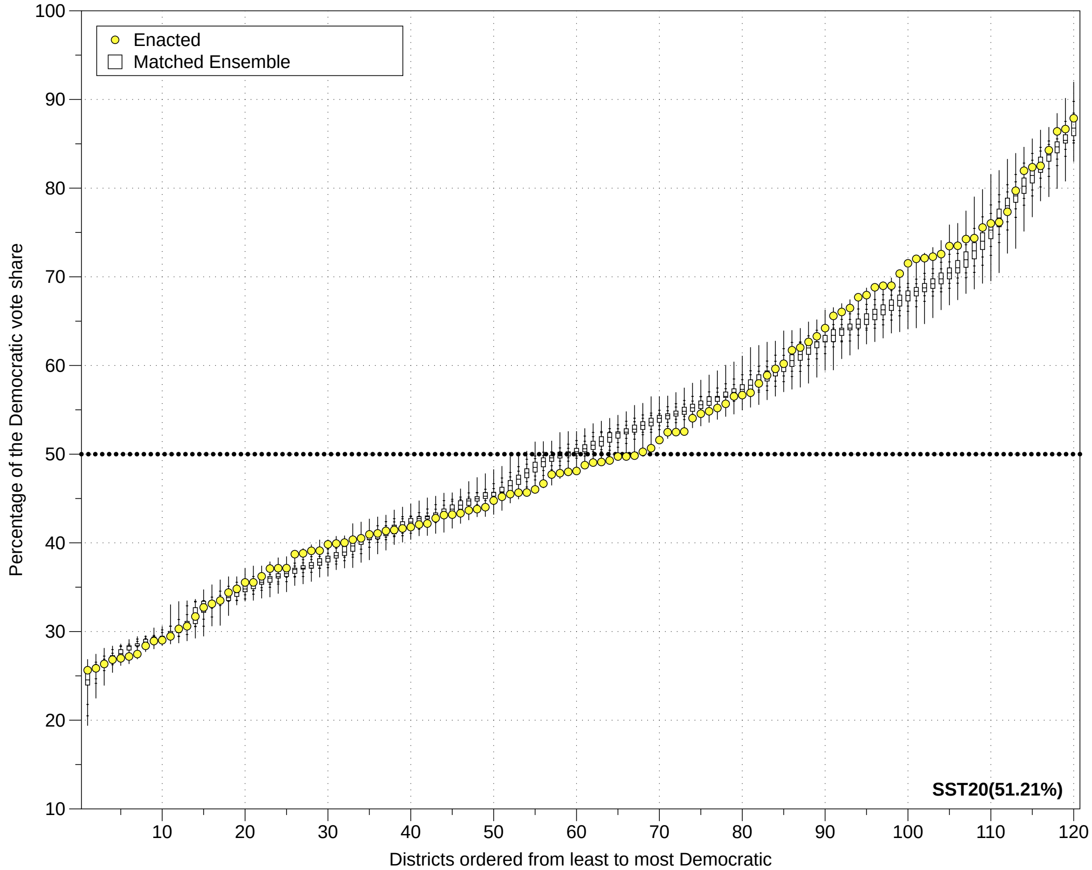
A NC House: Ranked-Ordered Marginal Boxplots

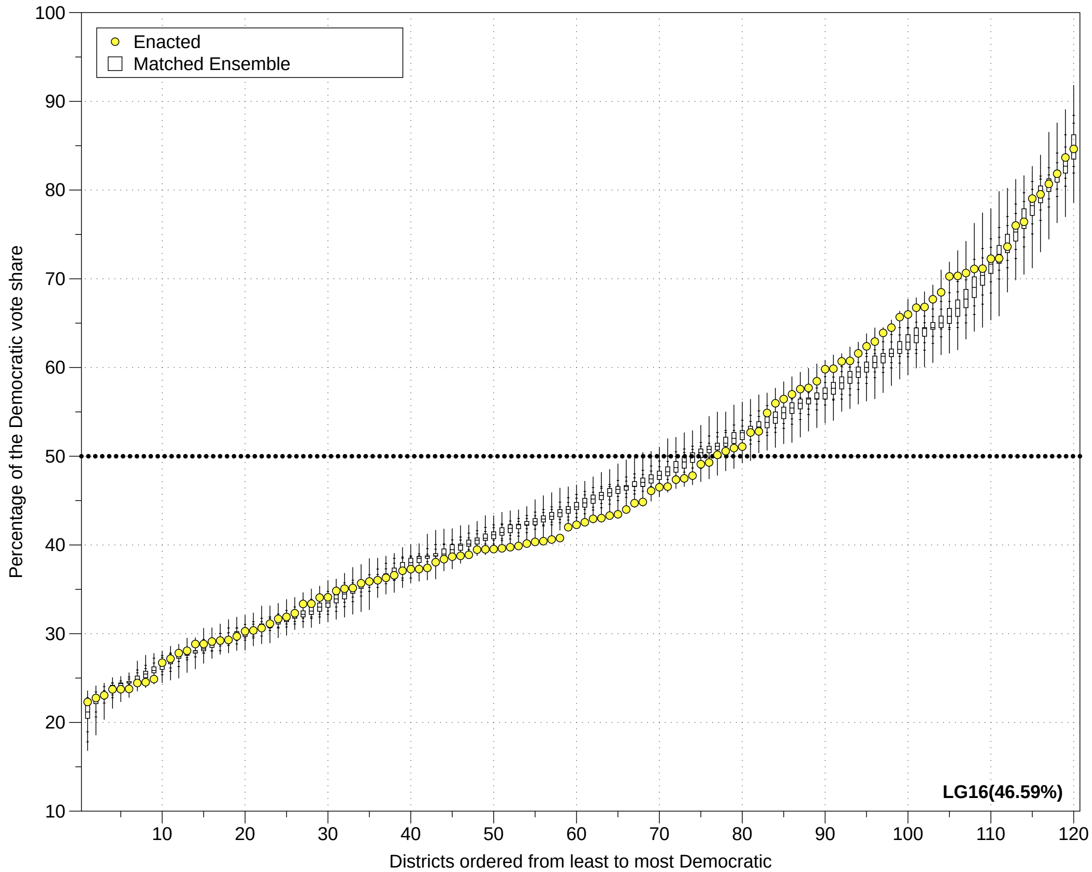


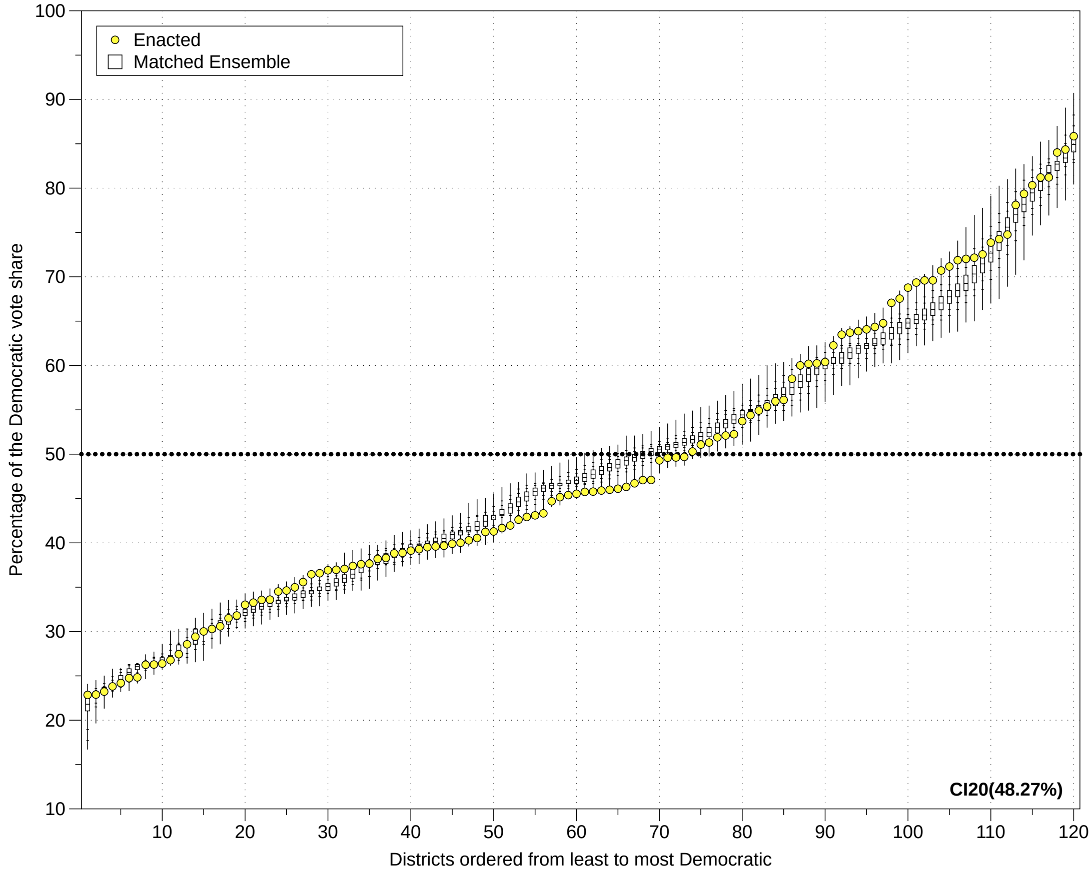


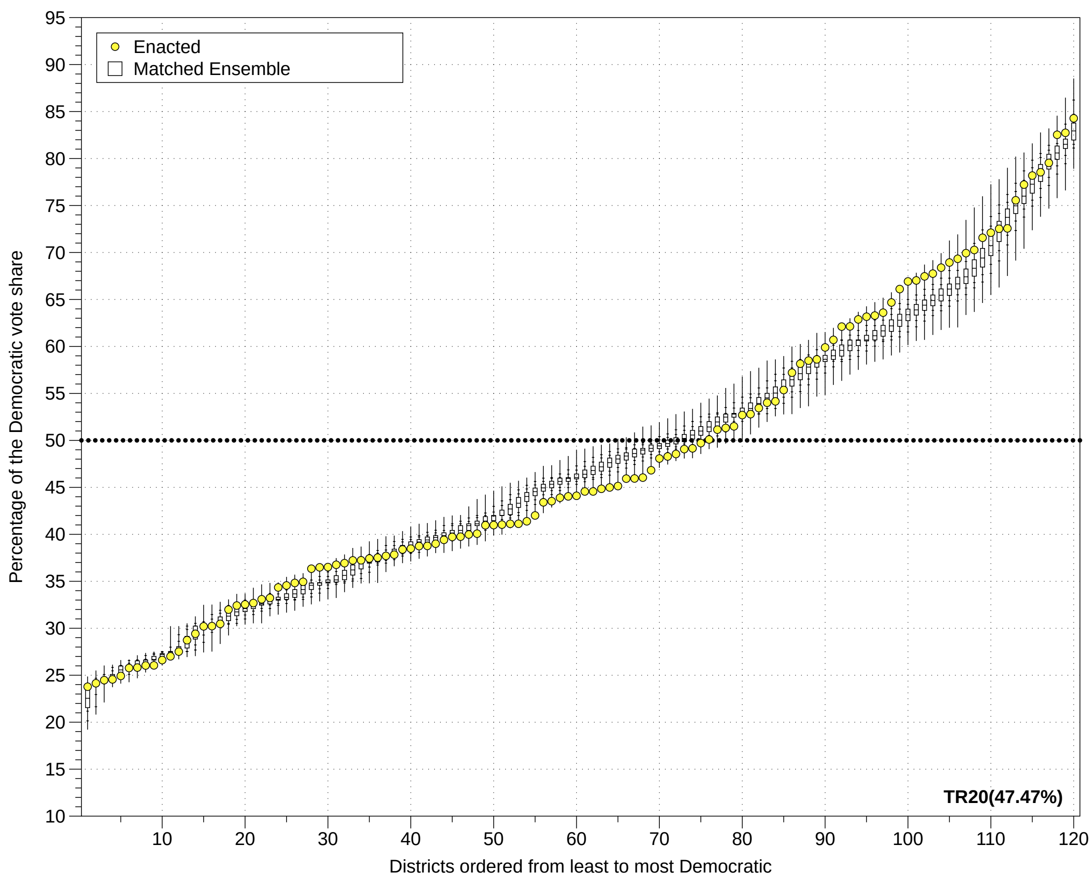

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
GV16(50.05%)

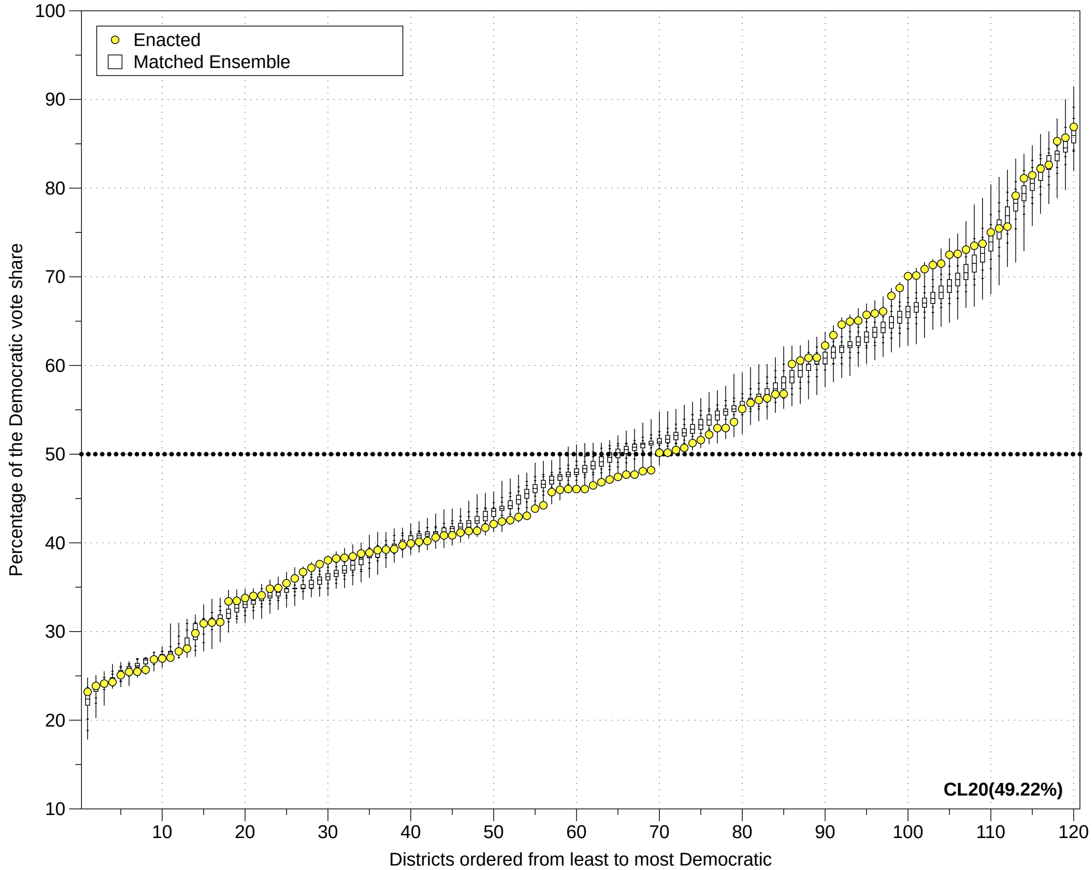

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
CA20(46.15%)

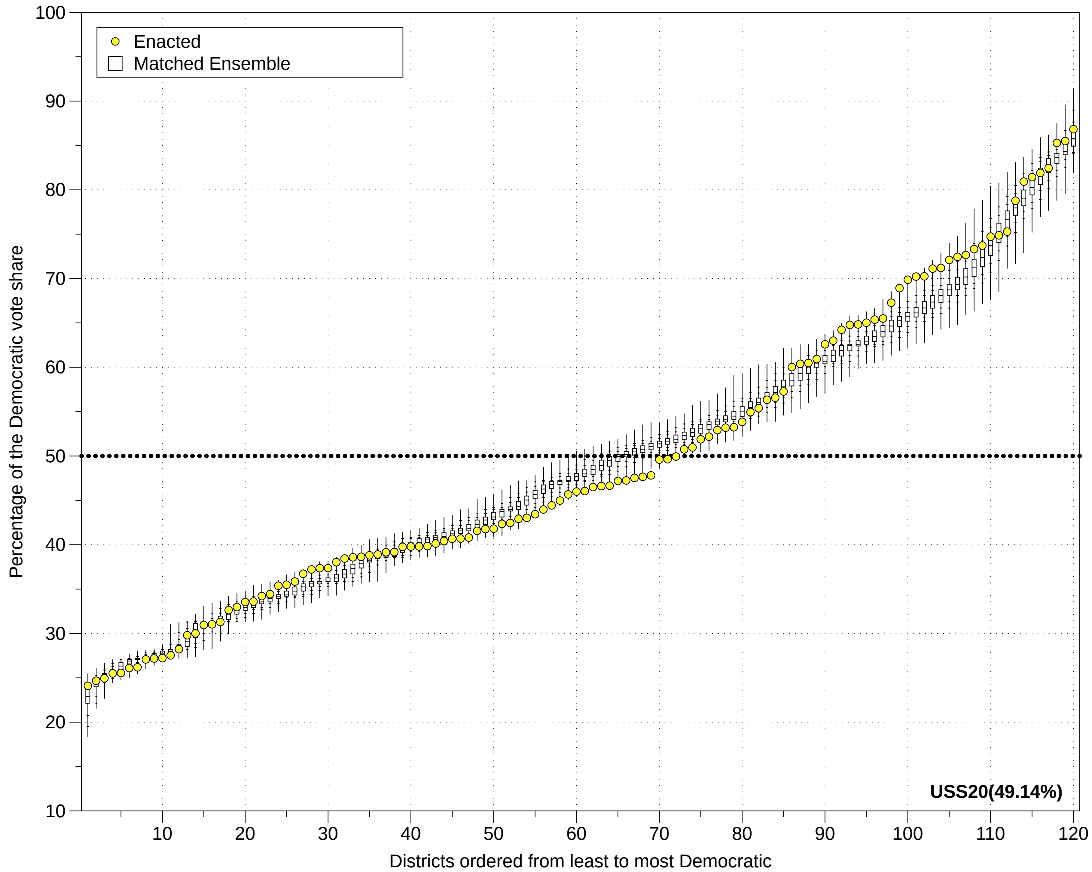

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
SST20(51.21%)

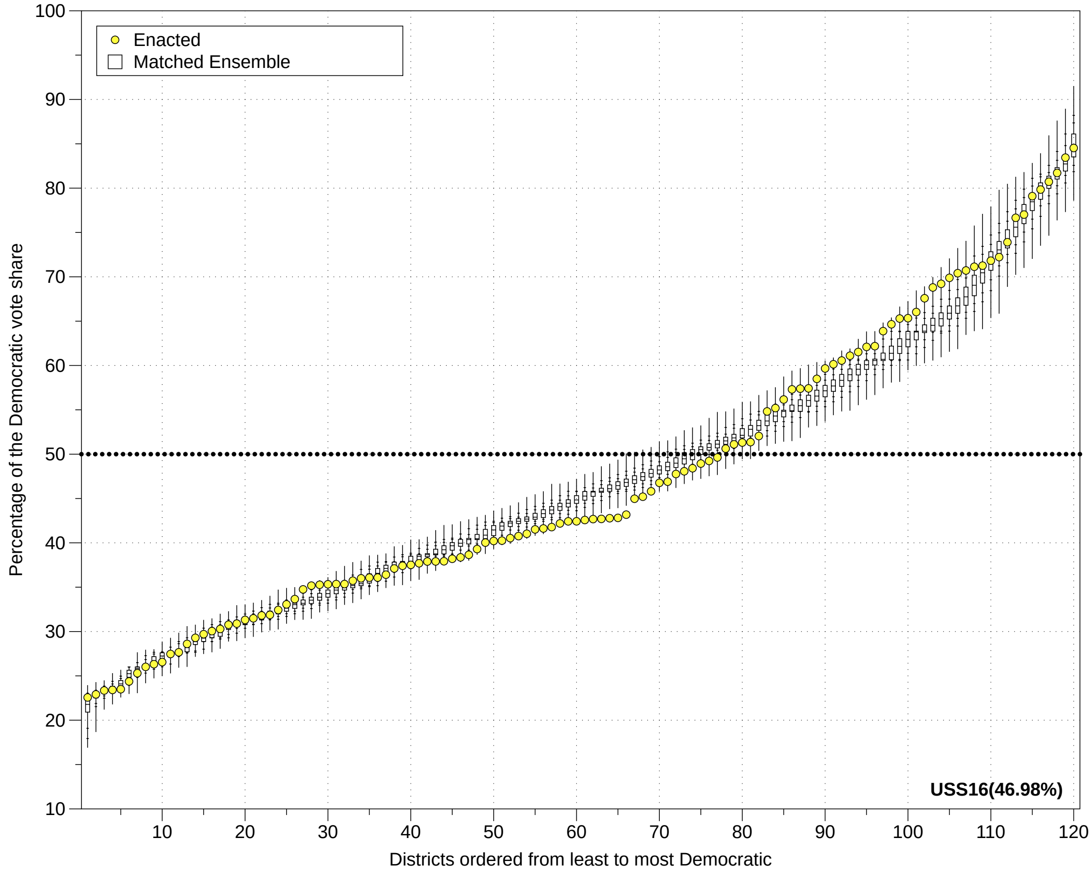

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
LG16(46.59%)

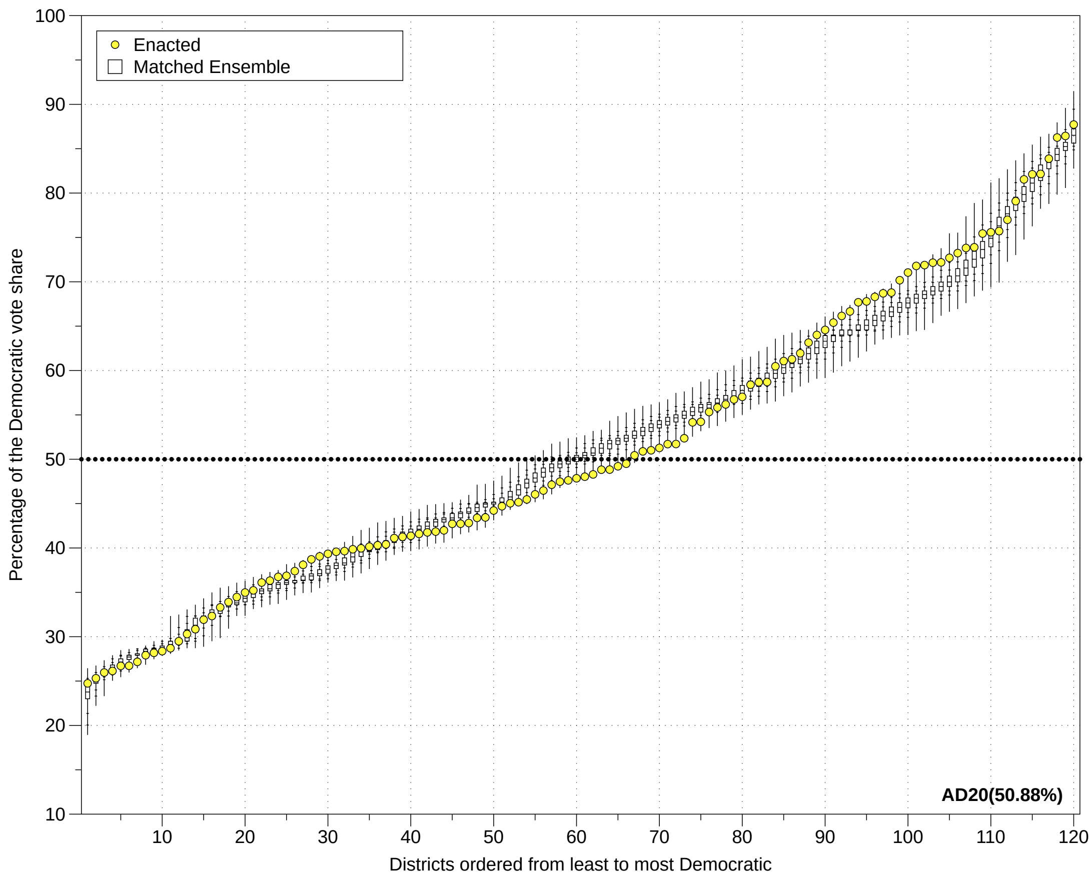

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
CI20(48.27%)

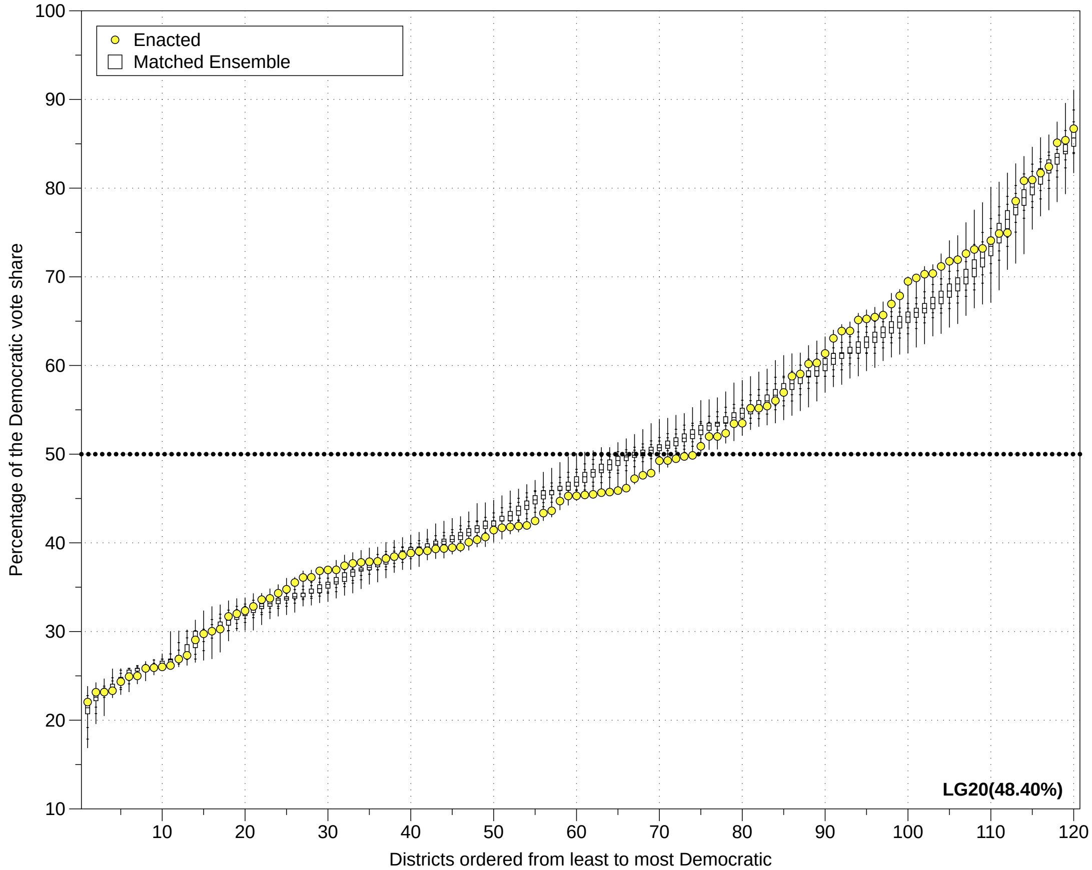

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
TR20(47.47%)


Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
CL20(49.22%)
100
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
100
110
120

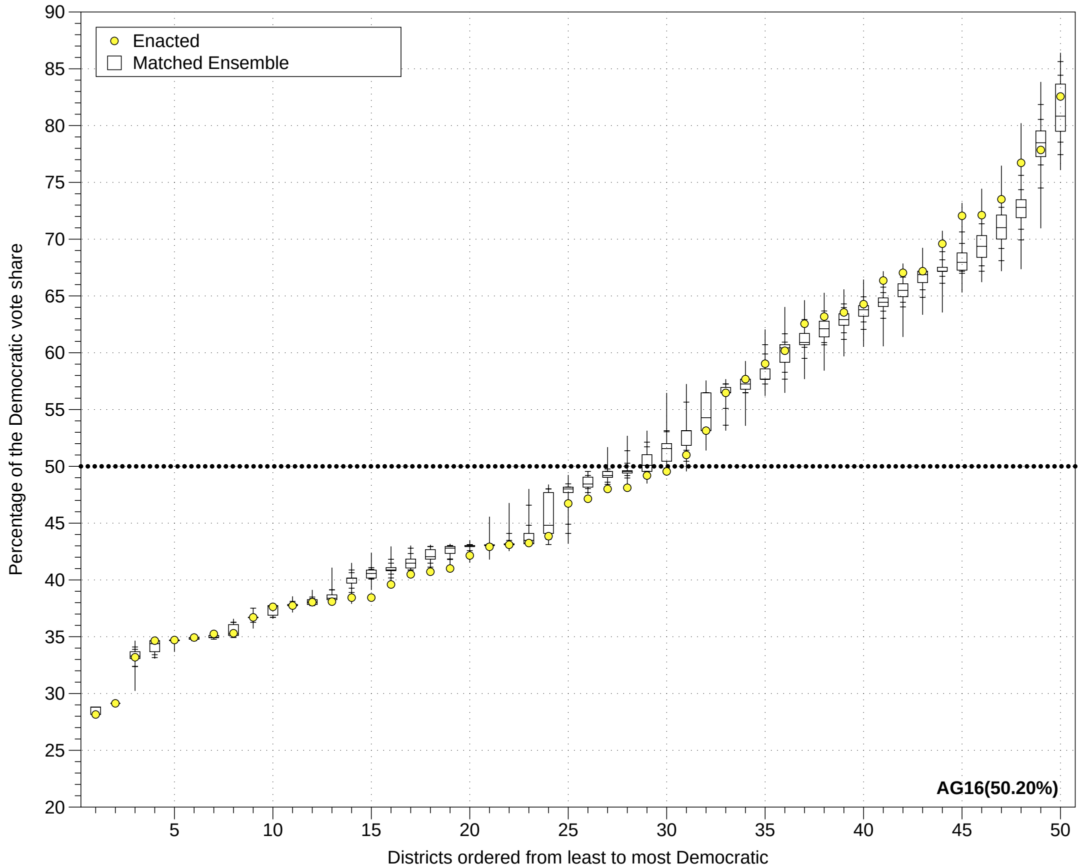

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
USS20(49.14%)
100
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
100
110
120

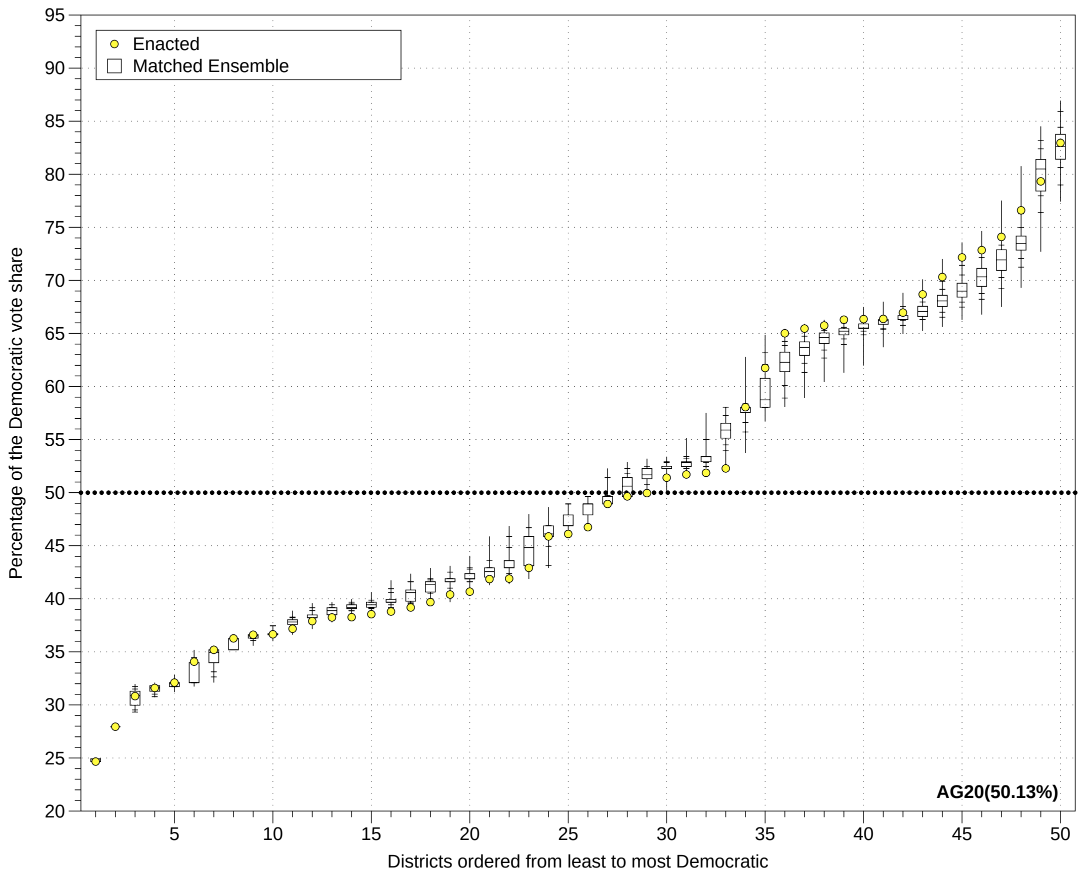

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
USS16(46.98%)
100
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
100
110
120

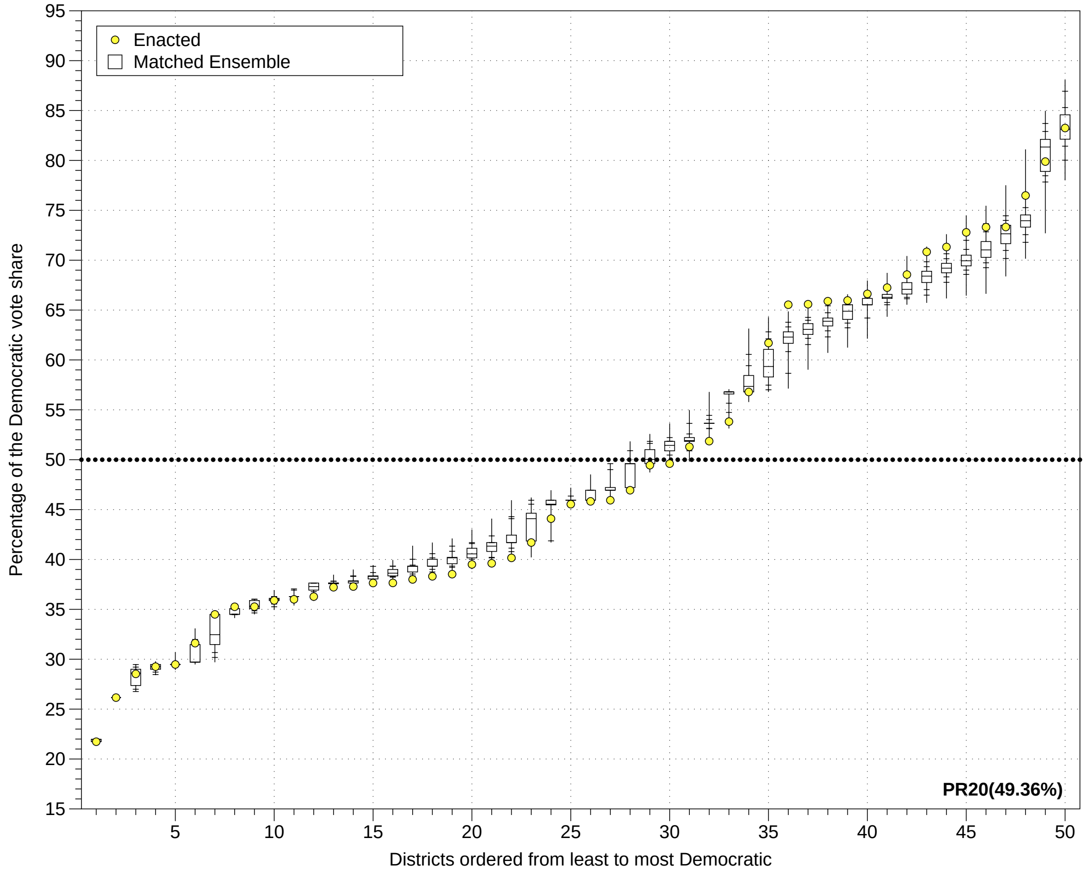

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
AD20(50.88%)
100
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
100
110
120

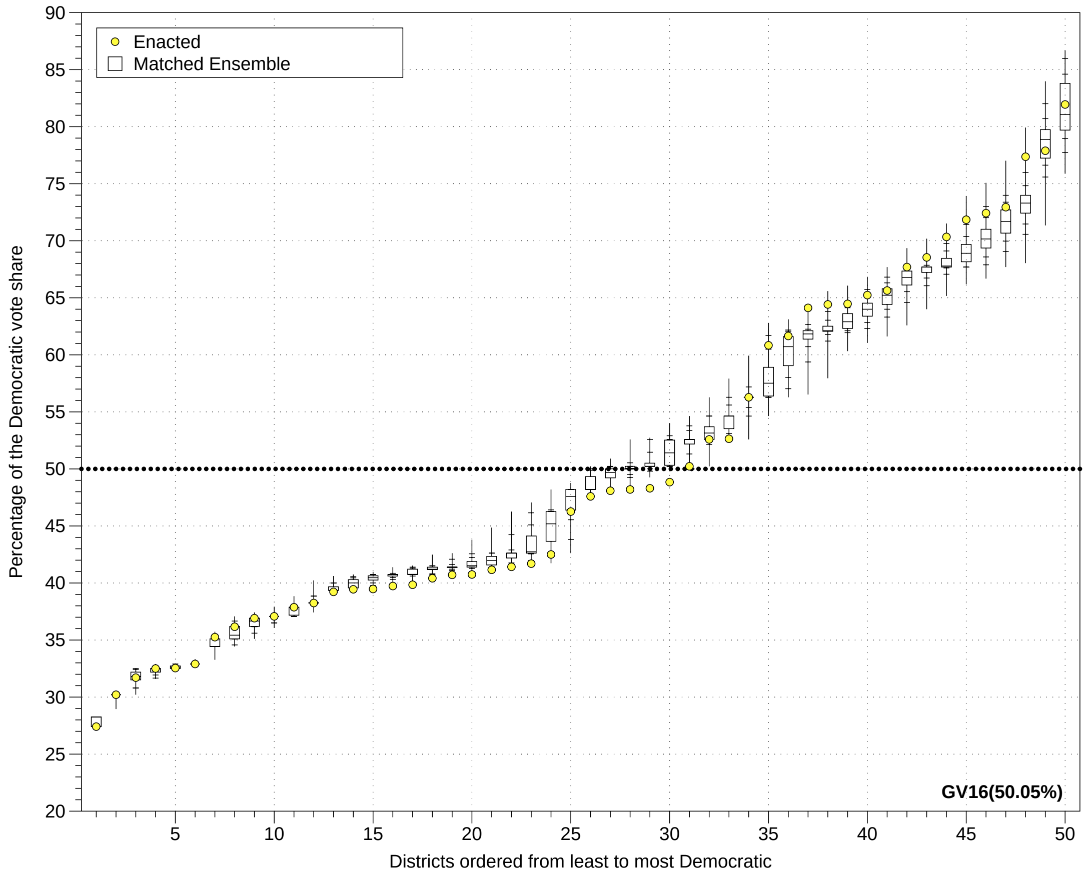

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
LG20(48.40%)
100
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
100
110
120

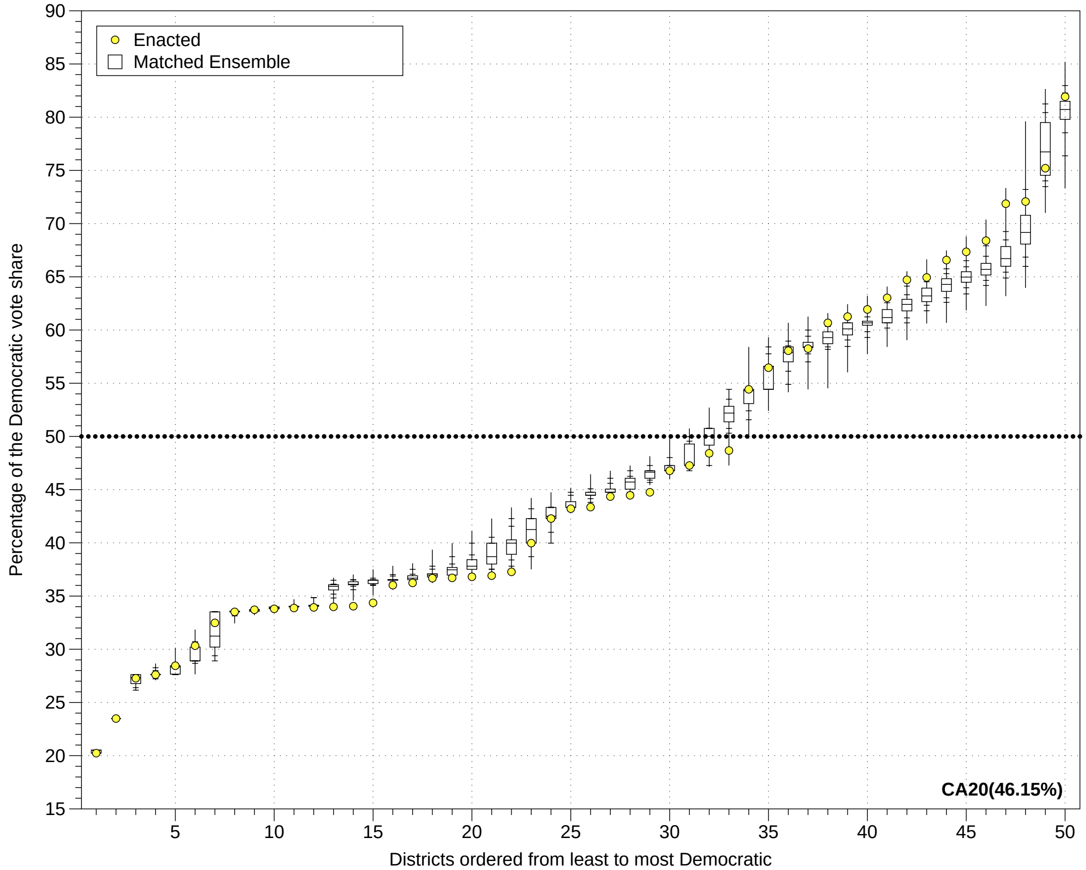
B NC Senate: Ranked-Ordered Marginal Boxplots

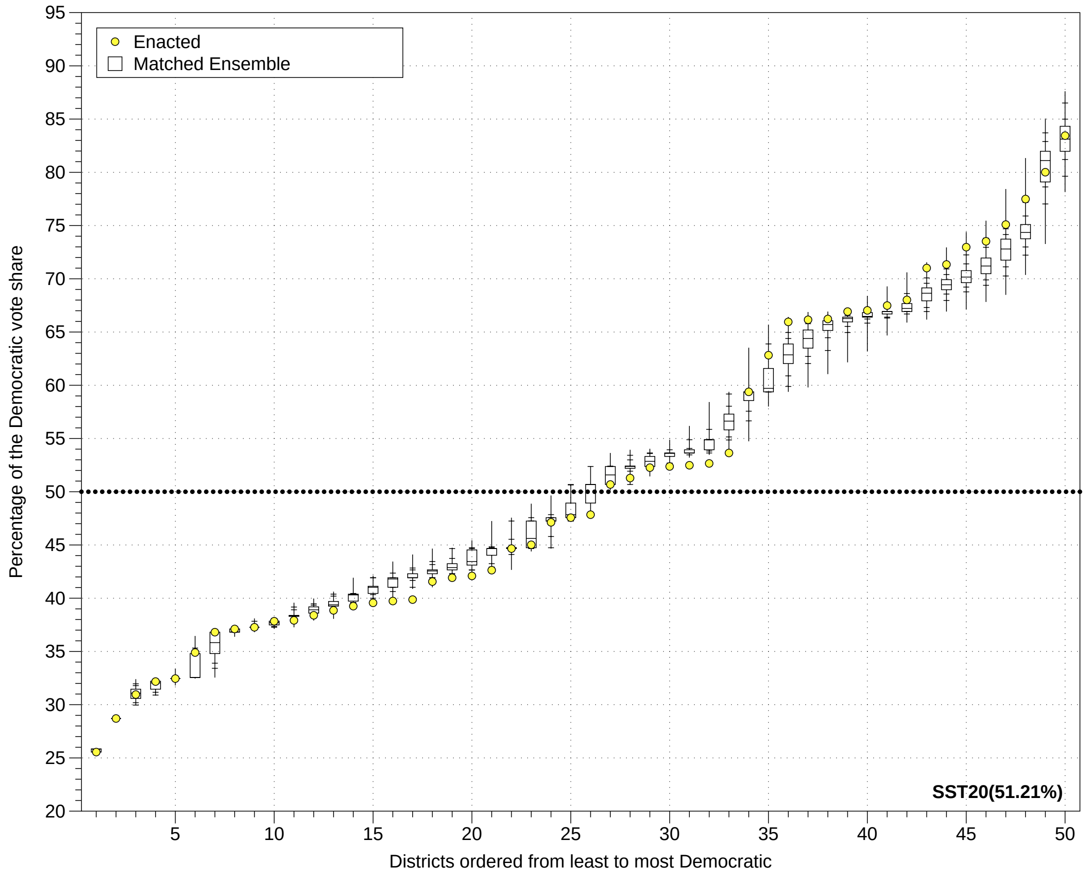


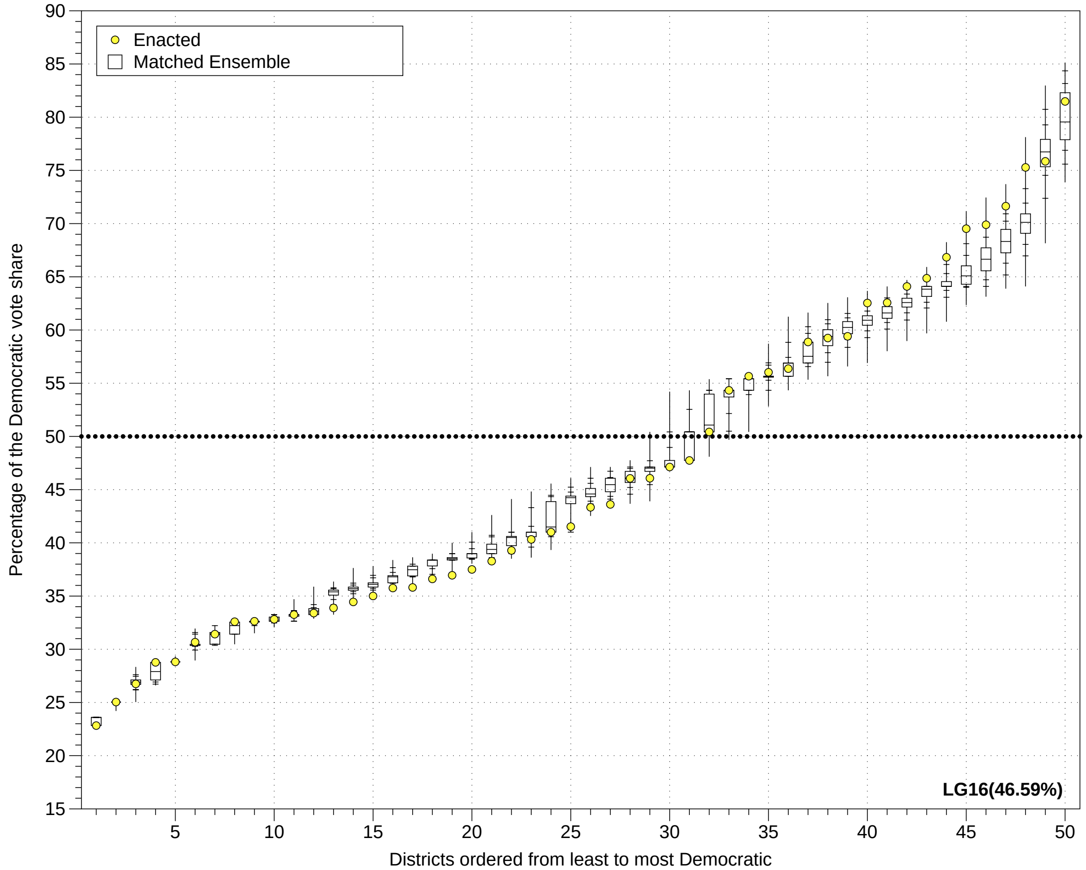


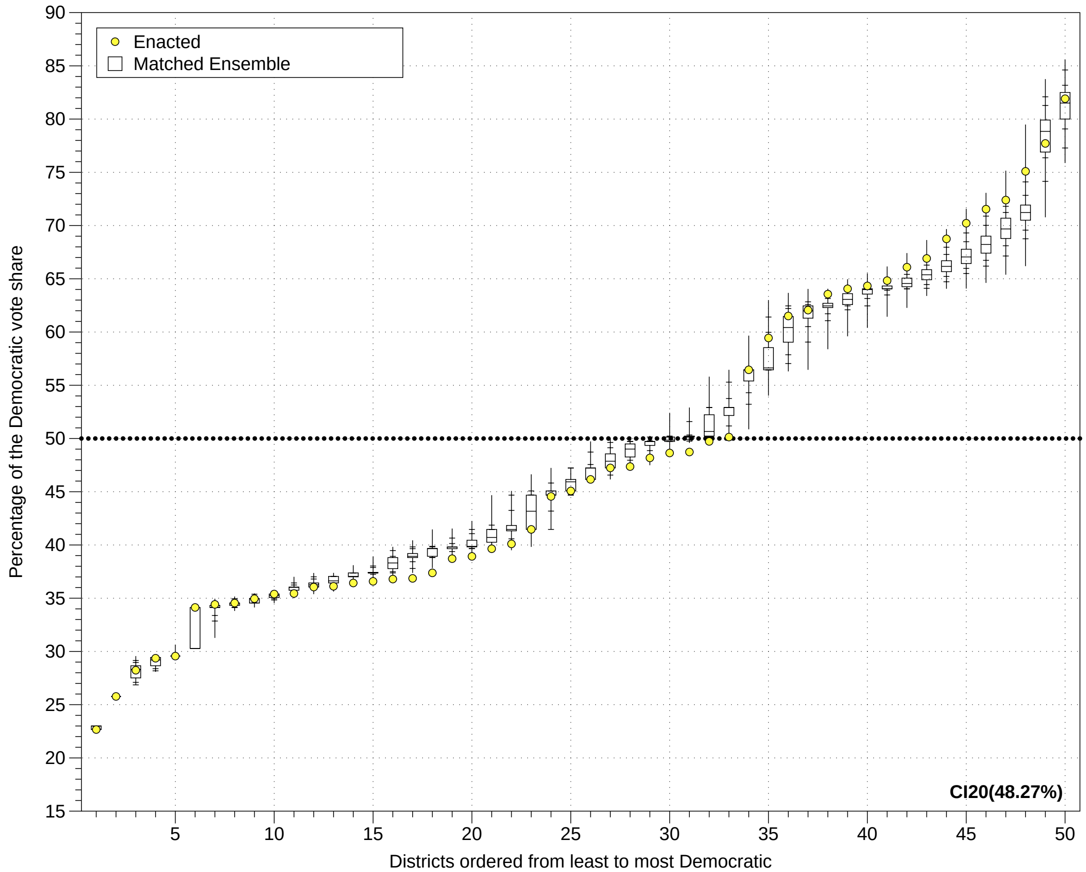

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
PR20(49.36%)

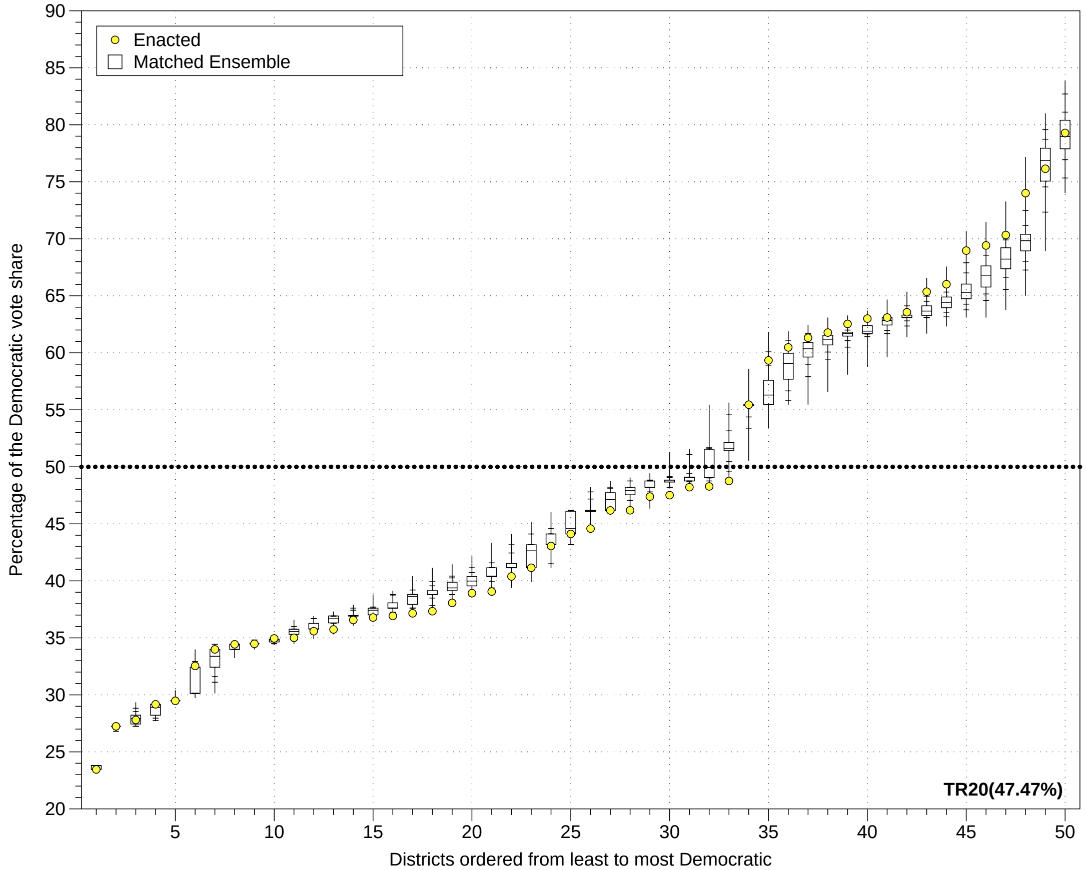

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
GV16(50.05%)

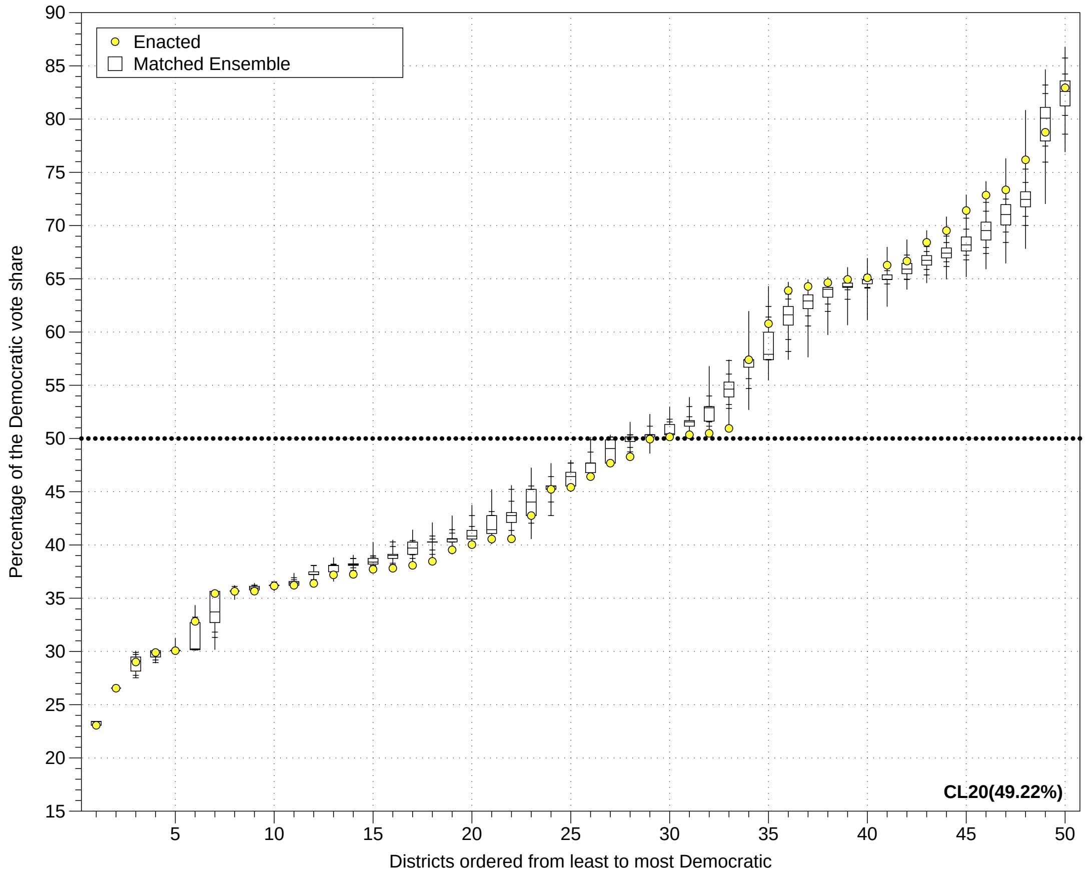

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
CA20(46.15%)

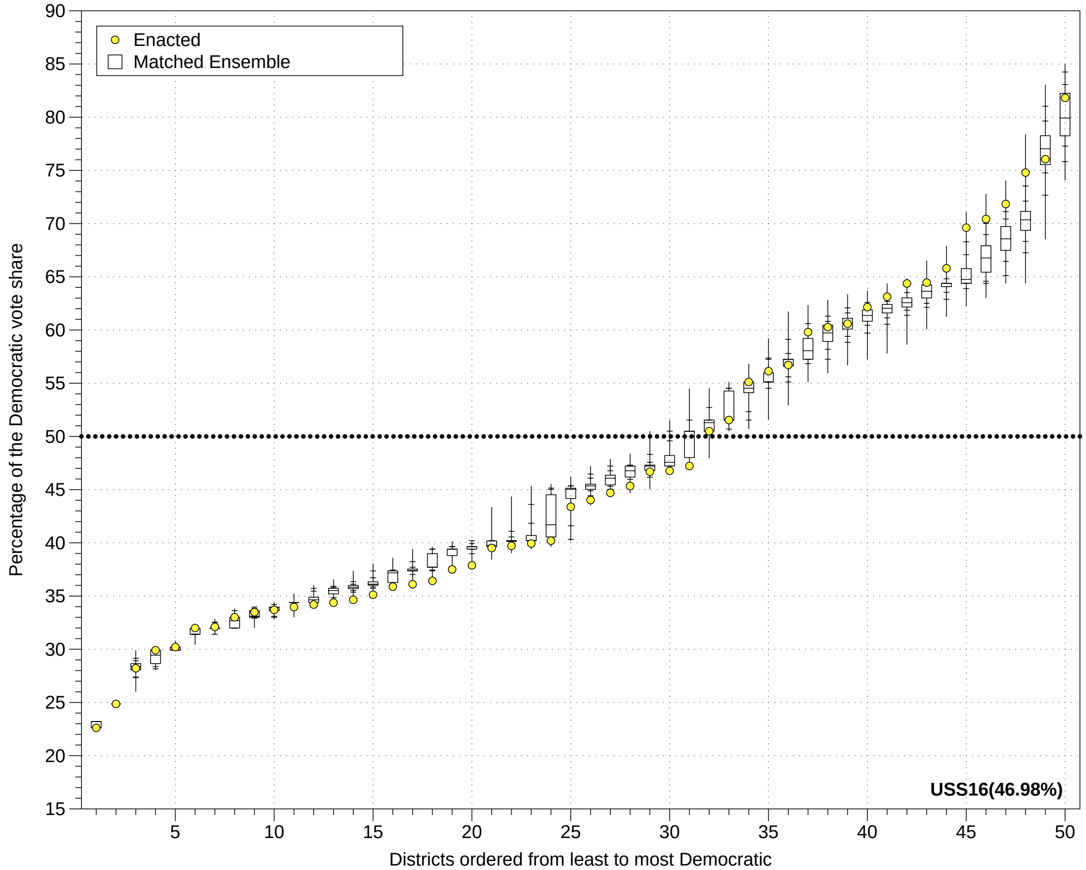

Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
SST20(51.21%)

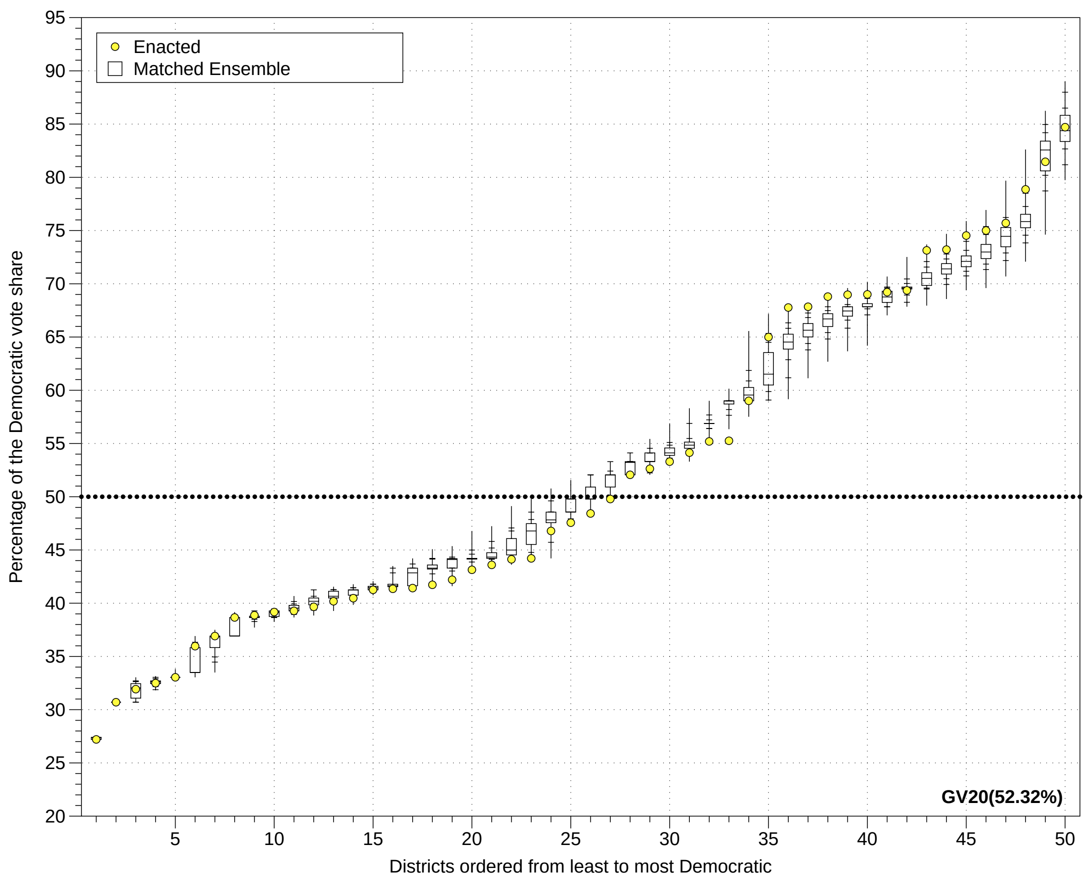

Enacted
Matched Ensemble
LG16(46.59%)
Percentage of the Democratic vote share
Districts ordered from least to most Democratic

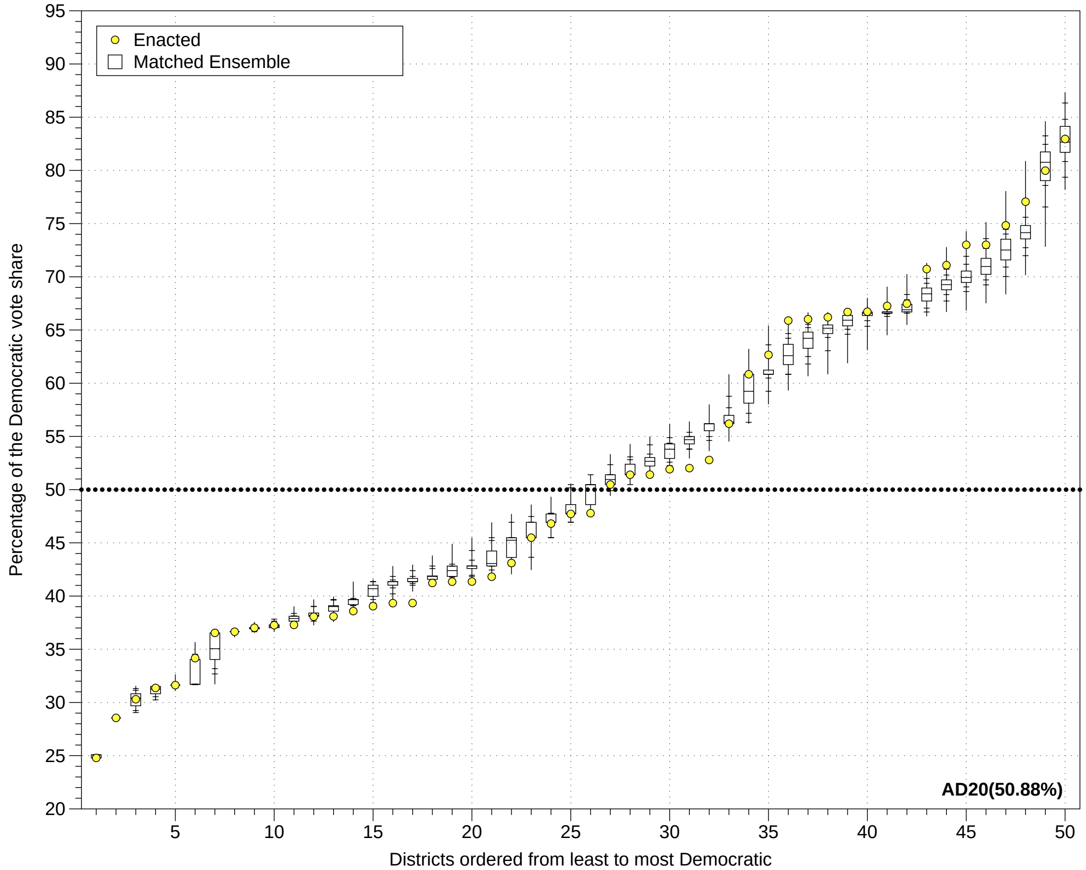

Enacted
Matched Ensemble
CI20(48.27%)
Percentage of the Democratic vote share
Districts ordered from least to most Democratic


Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
TR20(47.47%)


Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
CL20(49.22%)


Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
USS16(46.98%)


Enacted
Matched Ensemble
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
GV20(52.32%)


Enacted
Matched Ensemble
AD20(50.88%)
Percentage of the Democratic vote share
Districts ordered from least to most Democratic
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
5
10
15
20
25
30
35
40
45
50

C NC House: Additional Plots

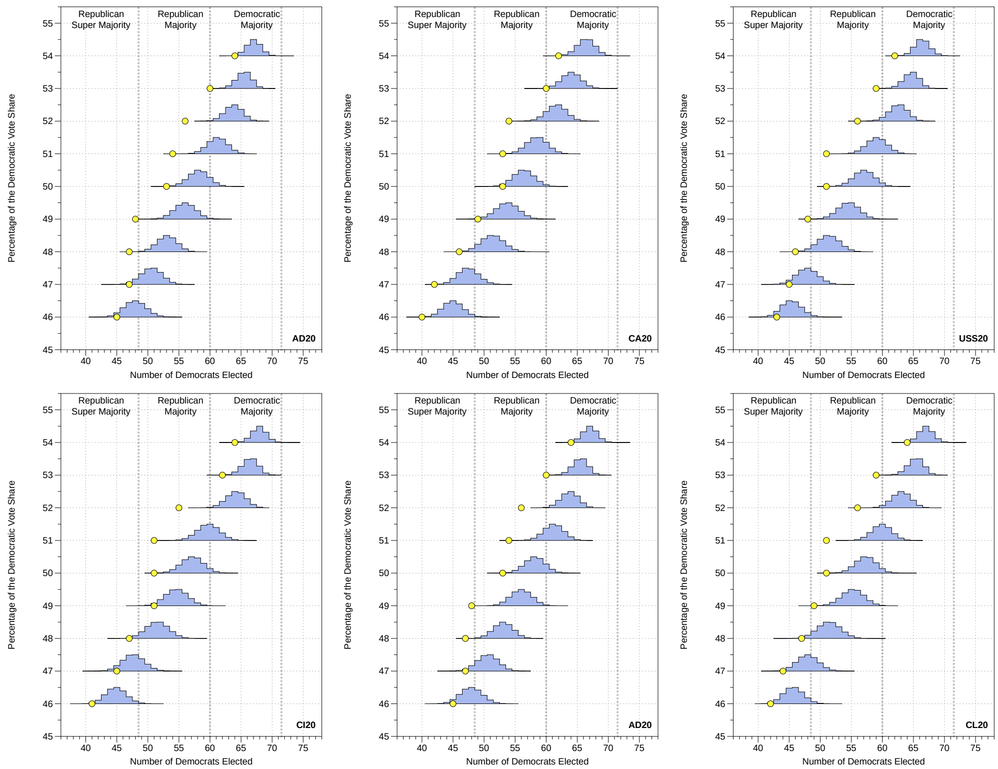


Figure C.0.1: The Collected Seat Histograms for the Primary Ensemble on the NC House built from a collection of voting data generated via uniform swing.

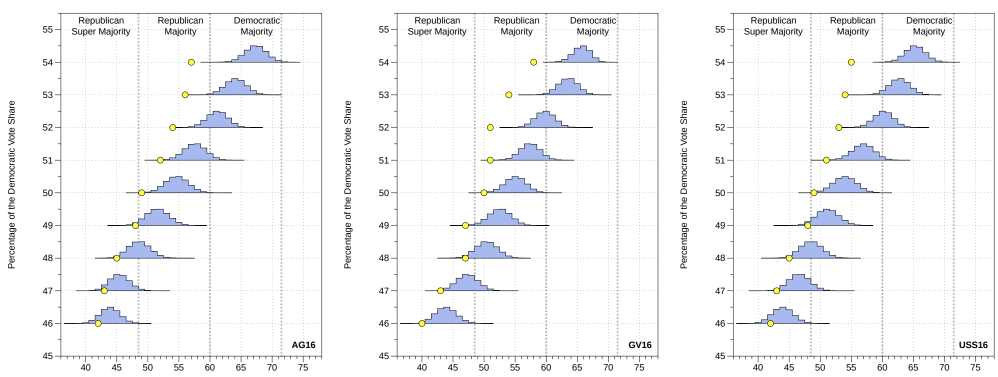


Figure C.0.2: The Collected Seat Histograms for the Primary Ensemble on the NC House built from a collection of voting data generated via uniform swing.

D NC Senate: Additional Plots

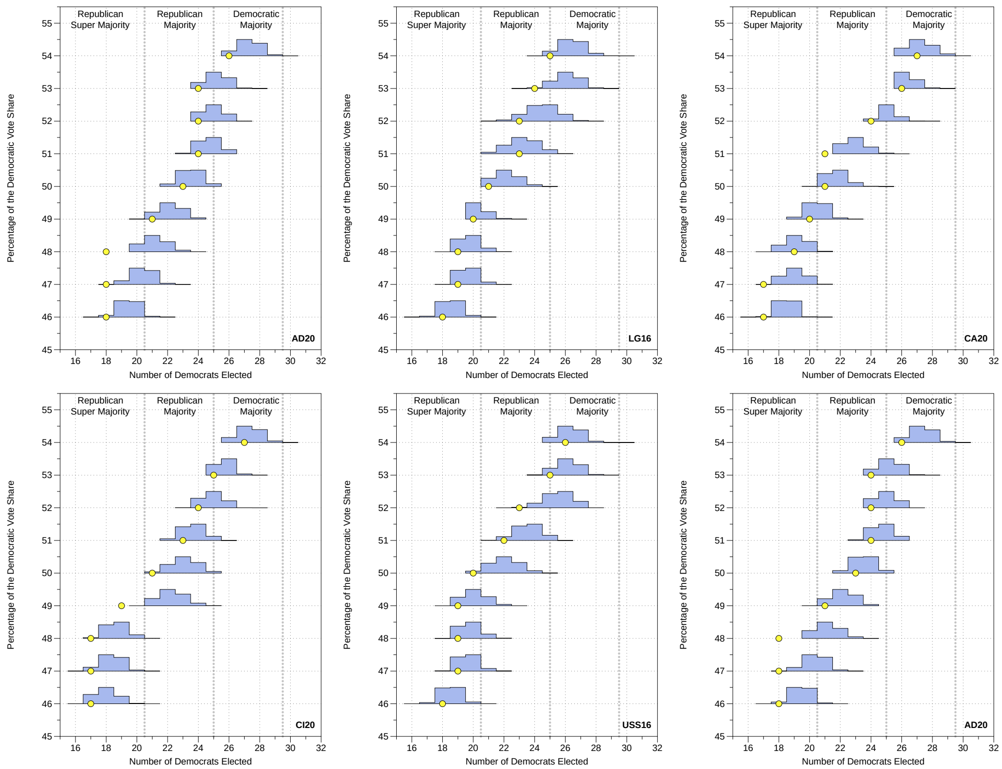


Figure D.0.1: The Collected Seat Histograms for the Primary Ensemble on the NC Senate built from a collection of voting data generated via uniform swing.

E NC Congressional: Ranked-Ordered Marginal Boxplots

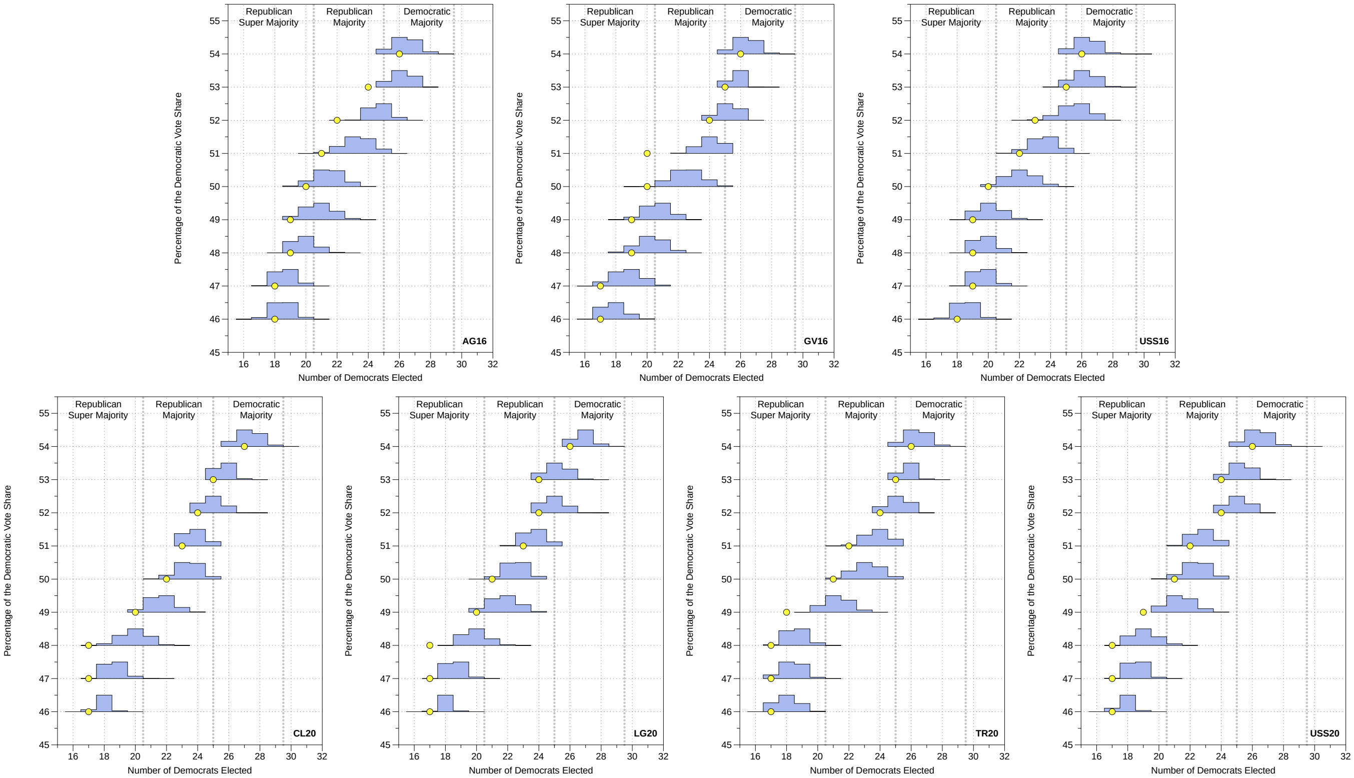


Figure D.0.2: The Collected Seat Histograms for the Primary Ensemble on the NC Senate built from a collection of voting data generated via uniform swing.

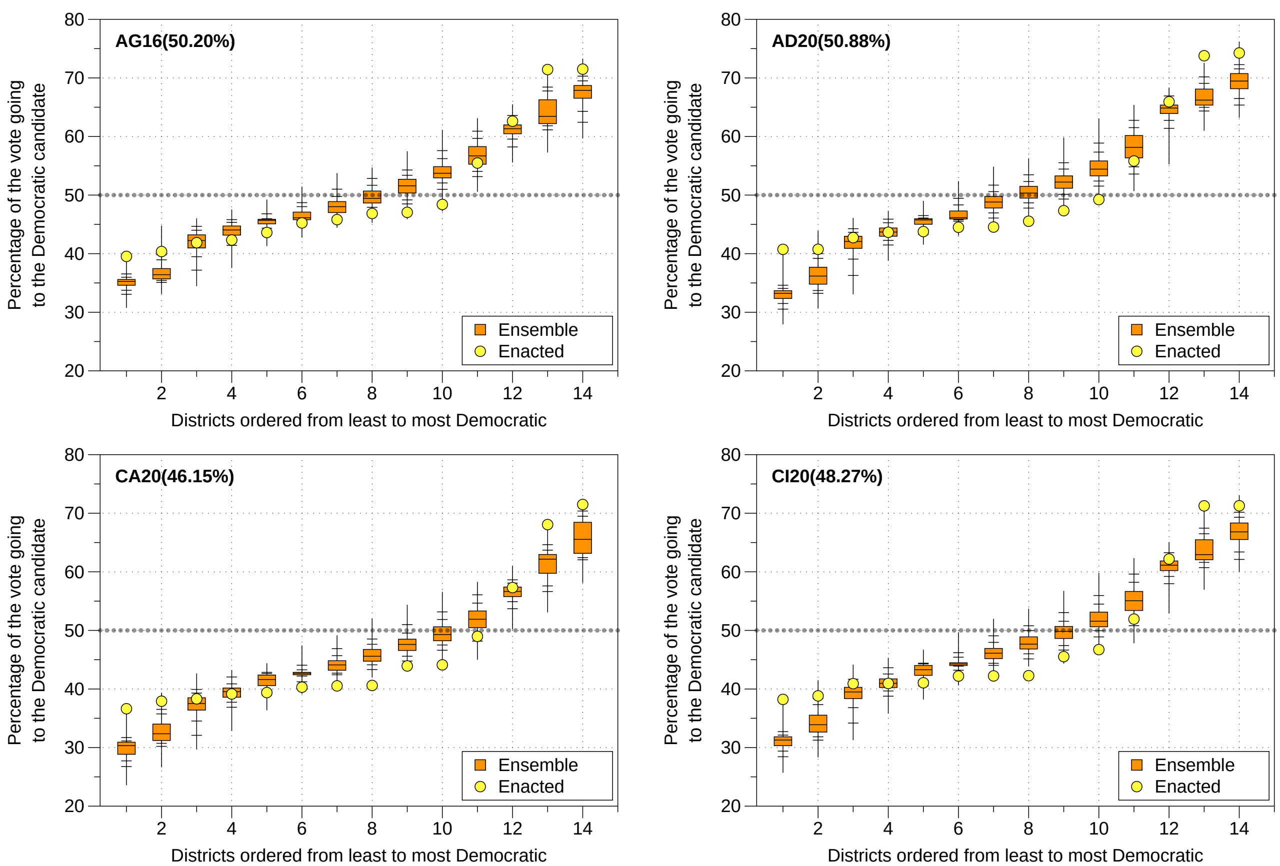


Figure E.0.1: something

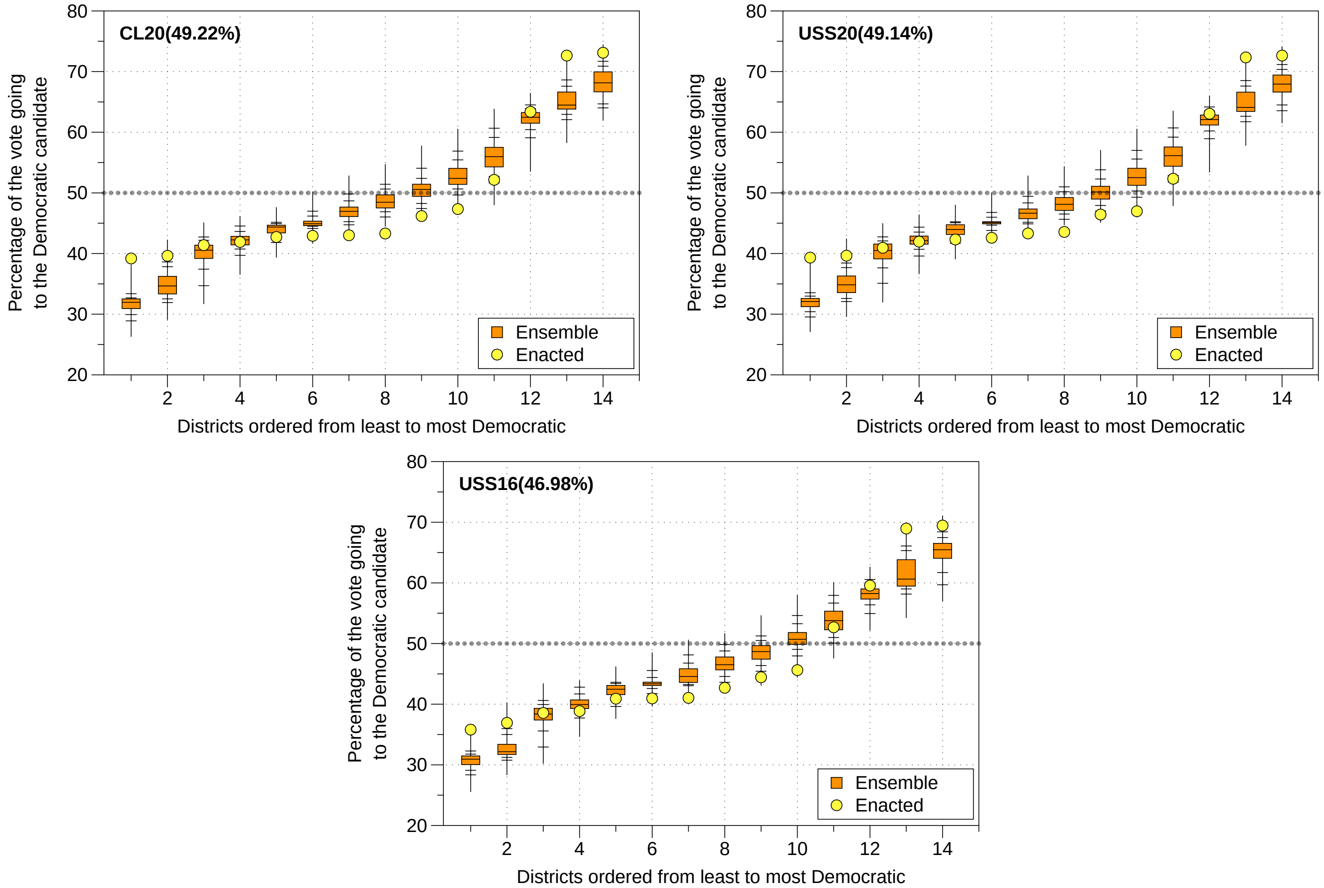


Figure E.0.2: something

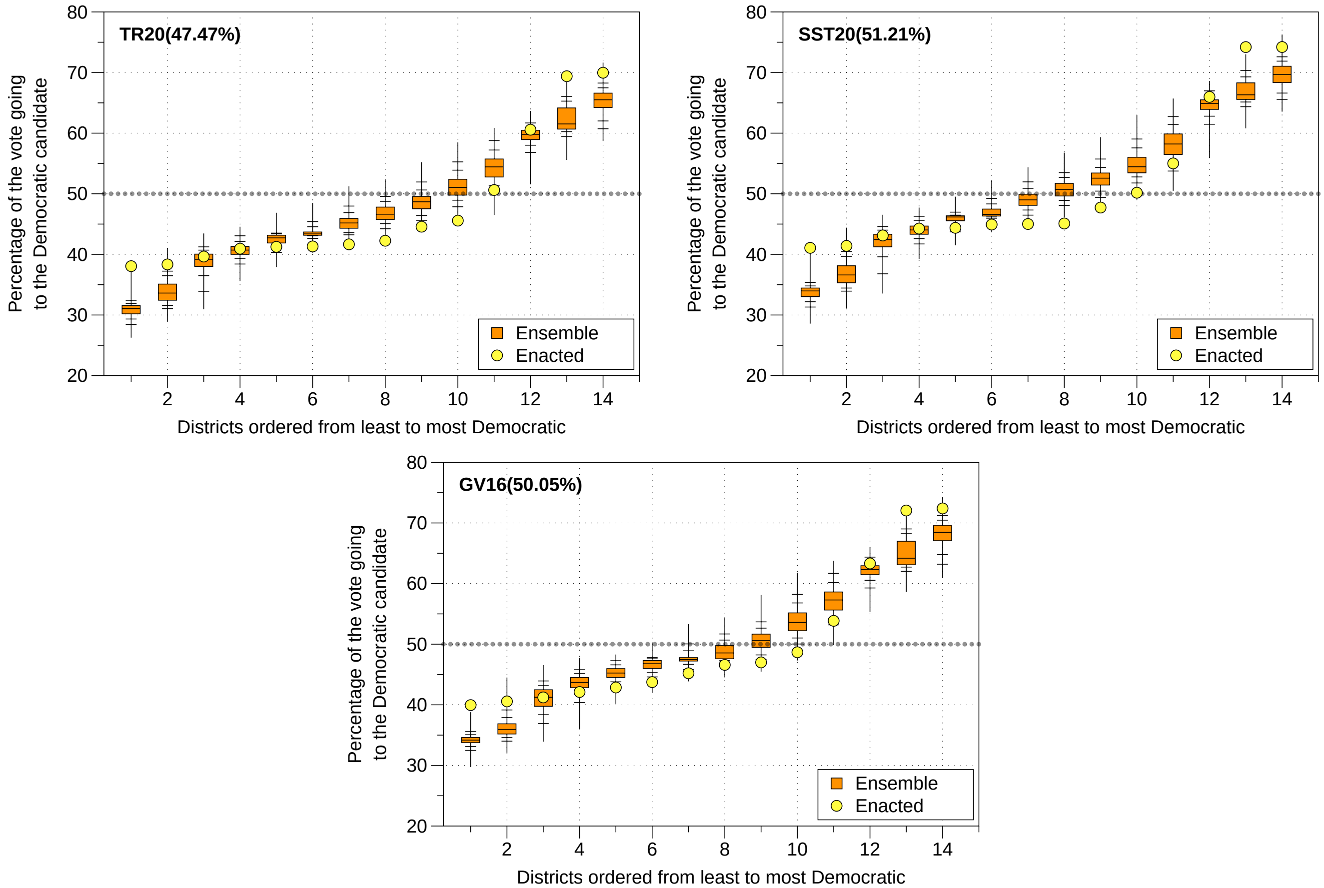


Figure E.0.3: something

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	13507	16.9	16380	20.5	79997	1	2
PR16	23688	29.6	25268	31.6	79997	1	2
AD20	7579	9.47	13561	17.0	79997	1	2
AG20	8831	11.0	14968	18.7	79997	1	2
CA20	7818	9.77	12779	16.0	79997	1	2
CL20	8308	10.4	14272	17.8	79997	1	2
GV20	14684	18.4	19730	24.7	79997	1	2
LG20	10040	12.6	15902	19.9	79997	1	2
PR20	15099	18.9	19674	24.6	79997	1	2
SST20	9265	11.6	15681	19.6	79997	1	2
TR20	10164	12.7	16049	20.1	79997	1	2
USS20	11197	14.0	16428	20.5	79997	1	2

Table 5: Alamance; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	384	0.48	2281	2.85	79997	2 3	4
PR16	288	0.36	4743	5.93	79997	2 3	4
AD20	72	0.09	5122	6.4	79997	2 3	4
AG20	64	0.08	5154	6.44	79997	2 3	4
CA20	48	0.06	4227	5.28	79997	2 3	4
CL20	56	0.07	4995	6.24	79997	2 3	4
GV20	200	0.25	6254	7.82	79997	2 3	4
LG20	80	0.1	5107	6.38	79997	2 3	4
PR20	128	0.16	5842	7.3	79997	2 3	4
SST20	72	0.09	5418	6.77	79997	2 3	4
TR20	80	0.1	4755	5.94	79997	2 3	4
USS20	56	0.07	4334	5.42	79997	2 3	4

Table 6: Brunswick-New Hanover; house

F Cluster-by-cluster outlier analysis

We quantify the visual trends seen in the cluster-by-cluster ordered marginal vote distributions. Similar to the analysis in Table 4, we group ranked districts and inquire how many plans in the ensemble have an average Democratic vote fraction that is more toward the extremes than the enacted plan. In general, lower numbers in the tables below signify more atypical clusters.

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	288	0.36	2406	3.01	79997	1	3
PR16	848	1.06	3910	4.89	79997	1	3
AD20	578	0.723	3738	4.67	79997	1	3
AG20	657	0.821	3711	4.64	79997	1	3
CA20	506	0.633	3072	3.84	79997	1	3
CL20	573	0.716	3578	4.47	79997	1	3
GV20	892	1.12	4803	6.0	79997	1	3
LG20	642	0.803	3699	4.62	79997	1	3
PR20	960	1.2	4790	5.99	79997	1	3
SST20	546	0.683	3305	4.13	79997	1	3
TR20	555	0.694	3295	4.12	79997	1	3
USS20	541	0.676	3404	4.26	79997	1	3

Table 7: Buncombe; house

Election	No. plans w/ ≥ Dems (First Cluster)	% of plans w/ ≥ Dems (First Cluster)	No. plans w/ ≤ Dems (Second Cluster)	% of plans w/ ≤ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	12935	16.2	12183	15.2	79997	3 4	5
PR16	13057	16.3	5371	6.71	79997	3 4	5
AD20	12585	15.7	1657	2.07	79997	3 4	5
AG20	12230	15.3	2081	2.6	79997	3 4	5
CA20	12445	15.6	1573	1.97	79997	3 4	5
CL20	12411	15.5	1785	2.23	79997	3 4	5
GV20	12167	15.2	1489	1.86	79997	3 4	5
LG20	12312	15.4	1789	2.24	79997	3 4	5
PR20	12320	15.4	921	1.15	79997	3 4	5
SST20	12059	15.1	1709	2.14	79997	3 4	5
TR20	12102	15.1	1537	1.92	79997	3 4	5
USS20	11901	14.9	1669	2.09	79997	3 4	5

Table 8: Cabarrus-Davie-Rowan-Yadkin; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	3767	4.71	13593	17.0	79997	2	3 4
PR16	5414	6.77	13064	16.3	79997	2	3 4
AD20	970	1.21	11880	14.9	79997	2	3 4
AG20	899	1.12	11149	13.9	79997	2	3 4
CA20	833	1.04	11167	14.0	79997	2	3 4
CL20	341	0.426	10790	13.5	79997	2	3 4
GV20	517	0.646	11339	14.2	79997	2	3 4
LG20	346	0.433	10829	13.5	79997	2	3 4
PR20	579	0.724	11315	14.1	79997	2	3 4
SST20	1206	1.51	12333	15.4	79997	2	3 4
TR20	587	0.734	10981	13.7	79997	2	3 4
USS20	360	0.45	10674	13.3	79997	2	3 4

Table 9: Cumberland; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	46063	57.6	46238	57.8	79997	1	2
PR16	43010	53.8	43894	54.9	79997	1	2
AD20	41097	51.4	41193	51.5	79997	1	2
AG20	38601	48.3	38516	48.1	79997	1	2
CA20	39051	48.8	39158	48.9	79997	1	2
CL20	38891	48.6	39038	48.8	79997	1	2
GV20	38179	47.7	38073	47.6	79997	1	2
LG20	38313	47.9	38392	48.0	79997	1	2
PR20	38660	48.3	38492	48.1	79997	1	2
SST20	41059	51.3	40686	50.9	79997	1	2
TR20	38891	48.6	39342	49.2	79997	1	2
USS20	38430	48.0	38734	48.4	79997	1	2

Table 10: Duplin-Wayne; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	0	0.0	2768	3.46	79997	1	3 4
PR16	0	0.0	409	0.511	79997	1	3 4
AD20	0	0.0	274	0.343	79997	1	3 4
AG20	0	0.0	312	0.39	79997	1	3 4
CA20	0	0.0	929	1.16	79997	1	3 4
CL20	0	0.0	417	0.521	79997	1	3 4
GV20	0	0.0	232	0.29	79997	1	3 4
LG20	0	0.0	328	0.41	79997	1	3 4
PR20	0	0.0	96	0.12	79997	1	3 4
SST20	0	0.0	296	0.37	79997	1	3 4
TR20	0	0.0	280	0.35	79997	1	3 4
USS20	0	0.0	497	0.621	79997	1	3 4

Table 11: Durham-Person; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	1	0.00125	659	0.824	79997	1 2 3	4 5
PR16	0	0.0	543	0.679	79997	1 2 3	4 5
AD20	8	0.01	952	1.19	79997	1 2 3	4 5
AG20	11	0.0138	1025	1.28	79997	1 2 3	4 5
CA20	11	0.0138	1032	1.29	79997	1 2 3	4 5
CL20	9	0.0113	995	1.24	79997	1 2 3	4 5
GV20	8	0.01	982	1.23	79997	1 2 3	4 5
LG20	8	0.01	980	1.23	79997	1 2 3	4 5
PR20	8	0.01	893	1.12	79997	1 2 3	4 5
SST20	0	0.0	912	1.14	79997	1 2 3	4 5
TR20	9	0.0113	944	1.18	79997	1 2 3	4 5
USS20	16	0.02	1106	1.38	79997	1 2 3	4 5

Table 12: Forsyth-Stokes; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	0	0.0	0	0.0	79997	1 2	3 4 5 6
PR16	0	0.0	0	0.0	79997	1 2	3 4 5 6
AD20	0	0.0	0	0.0	79997	1 2	3 4 5 6
AG20	0	0.0	0	0.0	79997	1 2	3 4 5 6
CA20	0	0.0	0	0.0	79997	1 2	3 4 5 6
CL20	0	0.0	0	0.0	79997	1 2	3 4 5 6
GV20	0	0.0	0	0.0	79997	1 2	3 4 5 6
LG20	0	0.0	0	0.0	79997	1 2	3 4 5 6
PR20	0	0.0	0	0.0	79997	1 2	3 4 5 6
SST20	0	0.0	0	0.0	79997	1 2	3 4 5 6
TR20	0	0.0	0	0.0	79997	1 2	3 4 5 6
USS20	0	0.0	0	0.0	79997	1 2	3 4 5 6

Table 13: Guilford; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	661	0.826	2	0.0025	79997	1 2 3 4	5 6 7 8
PR16	168	0.21	6	0.0075	79997	1 2 3 4	5 6 7 8
AD20	569	0.711	32	0.04	79997	1 2 3 4	5 6 7 8
AG20	763	0.954	35	0.0438	79997	1 2 3 4	5 6 7 8
CA20	1363	1.7	84	0.105	79997	1 2 3 4	5 6 7 8
CL20	1146	1.43	72	0.09	79997	1 2 3 4	5 6 7 8
GV20	396	0.495	40	0.05	79997	1 2 3 4	5 6 7 8
LG20	700	0.875	36	0.045	79997	1 2 3 4	5 6 7 8
PR20	202	0.253	19	0.0238	79997	1 2 3 4	5 6 7 8
SST20	496	0.62	29	0.0363	79997	1 2 3 4	5 6 7 8
TR20	975	1.22	88	0.11	79997	1 2 3 4	5 6 7 8
USS20	1082	1.35	69	0.0863	79997	1 2 3 4	5 6 7 8

Table 14: Mecklenburg; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	1194	1.49	899	1.12	79997	1	2
PR16	2115	2.64	1829	2.29	79997	1	2
AD20	8230	10.3	4317	5.4	79997	1	2
AG20	4434	5.54	2326	2.91	79997	1	2
CA20	2295	2.87	1334	1.67	79997	1	2
CL20	4069	5.09	2163	2.7	79997	1	2
GV20	6311	7.89	3379	4.22	79997	1	2
LG20	4123	5.15	2222	2.78	79997	1	2
PR20	6573	8.22	3564	4.46	79997	1	2
SST20	5386	6.73	2656	3.32	79997	1	2
TR20	4243	5.3	2177	2.72	79997	1	2
USS20	3799	4.75	2074	2.59	79997	1	2

Table 15: Pitt; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	209	0.261	6107	7.63	79997	1 2	3 4 5 6 7 8 9
PR16	160	0.2	4317	5.4	79997	1 2	3 4 5 6 7 8 9
AD20	240	0.3	4968	6.21	79997	1 2	3 4 5 6 7 8 9
AG20	230	0.288	4728	5.91	79997	1 2	3 4 5 6 7 8 9
CA20	1151	1.44	15113	18.9	79997	1 2	3 4 5 6 7 8 9
CL20	337	0.421	6643	8.3	79997	1 2	3 4 5 6 7 8 9
GV20	225	0.281	3777	4.72	79997	1 2	3 4 5 6 7 8 9
LG20	298	0.373	5552	6.94	79997	1 2	3 4 5 6 7 8 9
PR20	241	0.301	4462	5.58	79997	1 2	3 4 5 6 7 8 9
SST20	291	0.364	4572	5.72	79997	1 2	3 4 5 6 7 8 9
TR20	377	0.471	7229	9.04	79997	1 2	3 4 5 6 7 8 9
USS20	354	0.443	6912	8.64	79997	1 2	3 4 5 6 7 8 9

Table 16: Wake; house

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	48	0.06	0	0.0	79997	1	2
PR16	48	0.06	48	0.06	79997	1	2
AD20	48	0.06	48	0.06	79997	1	2
AG20	48	0.06	48	0.06	79997	1	2
CA20	48	0.06	48	0.06	79997	1	2
CL20	48	0.06	48	0.06	79997	1	2
GV20	48	0.06	48	0.06	79997	1	2
LG20	48	0.06	48	0.06	79997	1	2
PR20	48	0.06	48	0.06	79997	1	2
SST20	48	0.06	48	0.06	79997	1	2
TR20	48	0.06	48	0.06	79997	1	2
USS20	48	0.06	48	0.06	79997	1	2

Table 17: Cumberland-Moore; senate

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	855	1.07	3472	4.34	79997	1	2
PR16	600	0.75	1822	2.28	79997	1	2
AD20	506	0.633	1745	2.18	79997	1	2
AG20	595	0.744	2455	3.07	79997	1	2
CA20	570	0.713	2521	3.15	79997	1	2
CL20	550	0.688	2191	2.74	79997	1	2
GV20	471	0.589	1496	1.87	79997	1	2
LG20	485	0.606	1967	2.46	79997	1	2
PR20	447	0.559	1392	1.74	79997	1	2
SST20	515	0.644	1827	2.28	79997	1	2
TR20	646	0.808	2696	3.37	79997	1	2
USS20	498	0.623	2174	2.72	79997	1	2

Table 18: Forsyth-Stokes; senate

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	0	0.0	6	0.015	39991	1 2	3 4 5 6
PR16	0	0.0	3	0.0075	39991	1 2	3 4 5 6
AD20	0	0.0	0	0.0	39991	1 2	3 4 5 6
AG20	0	0.0	0	0.0	39991	1 2	3 4 5 6
CA20	0	0.0	9	0.0225	39991	1 2	3 4 5 6
CL20	0	0.0	4	0.01	39991	1 2	3 4 5 6
GV20	0	0.0	0	0.0	39991	1 2	3 4 5 6
LG20	0	0.0	0	0.0	39991	1 2	3 4 5 6
PR20	0	0.0	0	0.0	39991	1 2	3 4 5 6
SST20	0	0.0	0	0.0	39991	1 2	3 4 5 6
TR20	0	0.0	5	0.0125	39991	1 2	3 4 5 6
USS20	0	0.0	4	0.01	39991	1 2	3 4 5 6

Table 19: Granville-Wake; senate

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	0	0.0	13	0.0163	79997	1	3
PR16	0	0.0	13	0.0163	79997	1	3
AD20	0	0.0	54	0.0675	79997	1	3
AG20	0	0.0	33	0.0413	79997	1	3
CA20	0	0.0	15	0.0188	79997	1	3
CL20	0	0.0	23	0.0288	79997	1	3
GV20	0	0.0	56	0.07	79997	1	3
LG20	0	0.0	22	0.0275	79997	1	3
PR20	0	0.0	59	0.0738	79997	1	3
SST20	0	0.0	32	0.04	79997	1	3
TR20	0	0.0	20	0.025	79997	1	3
USS20	0	0.0	23	0.0288	79997	1	3

Table 20: Guilford-Rockingham; senate

Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
LG16	0	0.0	0	0.0	79997	1 2	3 4 5 6
PR16	0	0.0	0	0.0	79997	1 2	3 4 5 6
AD20	0	0.0	0	0.0	79997	1 2	3 4 5 6
AG20	0	0.0	0	0.0	79997	1 2	3 4 5 6
CA20	0	0.0	8	0.01	79997	1 2	3 4 5 6
CL20	0	0.0	0	0.0	79997	1 2	3 4 5 6
GV20	0	0.0	0	0.0	79997	1 2	3 4 5 6
LG20	0	0.0	0	0.0	79997	1 2	3 4 5 6
PR20	0	0.0	0	0.0	79997	1 2	3 4 5 6
SST20	0	0.0	0	0.0	79997	1 2	3 4 5 6
TR20	0	0.0	8	0.01	79997	1 2	3 4 5 6
USS20	0	0.0	0	0.0	79997	1 2	3 4 5 6

Table 21: Iredell-Mecklenburg; senate

References

[1] Eric Autrey, Daniel Carter, Gregory Herschlag, Zach Hunter, and Jonathan C. Mattingly. Metropolized forest recombination for monte carlo sampling of graph partitions, 2021.

[2] Eric A. Autry, Daniel Carter, Gregory Herschlag, Zach Hunter, and Jonathan C. Mattingly. Multi-scale merge-split markov chain monte carlo for redistricting, 2020.

[3] Daniel Carter, Gregory Herschlag, Zach Hunter, and Jonathan Mattingly. A merge-split proposal for reversible monte carlo markov chain sampling of redistricting plans. *CoRR*, abs/1911.01503, 2019.

[4] Daniel Carter, Zach Hunter, Dan Teague, Gregory Herschlag, and Jonathan Mattingly. Optimal legislative county clustering in north carolina. *Statistics and Public Policy*, 7(1):19–29, 2020.

[5] Christopher Cooper, Blake Esselstyn, Gregory Herschlag, Jonathan Mattingly, and Rebecca Tippett. NC general assembly county clusterings from the 2020 census. Technical report, Duke University, August 2020. Quantyfing Gerrymandering Blog.

[6] Christopher Cooper, Blake Esselstyn, Gregory Herschlag, Jonathan Mattingly, and Rebecca Tippett. Nc general assembly county clusterings from the 2020 census. https://sites.duke.edu/quantifyinggerrymandering/files/2021/08/countyClusters2020.pdf, 2021.

[7] Gregory Herschlag, Han Sung Kang, Justin Luo, Christy Vaughn Graves, Sachet Bangia, Robert Ravier, and Jonathan C. Mattingly. Quantifying gerrymandering in north carolina. *Statistics and Public Policy*, 7(1):30–38, 2020.

[8] Gregory Herschlag, Robert Ravier, and Jonathan C. Mattingly. Evaluating Partisan Gerrymandering in Wisconsin. *arXiv e-prints*, page arXiv:1709.01596, Sep 2017.

[9] NC Legislature. 2021 joint redistricting committee adopted criteria. https://www.ncleg.gov/documentsites/committees/Senate2021-154/2021/08-12-2021/Criteria.adopted.8.12.pdf, 2021.

[10] J. C. Mattingly and C. Vaughn. Redistricting and the Will of the People. *ArXiv e-prints*, October 2014.

I declare under penalty of perjury under the laws of the state of North Carolina that the foregoing is true and correct to the best of my knowledge.

Jonathan Mattingly, 12/23/2021

NCLCV v. Hall
21 CVS 15426
LDTX196

Exhibit #
Mattingly 3
12/31/21 - MS
exhibitsticker.com

Joint Meeting of Committees

August 12, 2021

House Committee on Redistricting
Senate Committee on Redistricting and Elections

Criteria Adopted by the Committees

- **Equal Population.** The Committees will use the 2020 federal decennial census data as the sole basis of population for the establishment of districts in the 2021 Congressional, House, and Senate plans. The number of persons in each legislative district shall be within plus or minus 5% of the ideal district population, as determined under the most recent federal decennial census. The number of persons in each congressional district shall be as nearly as equal as practicable, as determined under the most recent federal decennial census.

- **Contiguity.** No point contiguity shall be permitted in any 2021 Congressional, House, and Senate plan. Congressional, House, and Senate districts shall be compromised of contiguous territory. Contiguity by water is sufficient.

- **Counties, Groupings, and Traversals.** The Committees shall draw legislative districts within county groupings as required by *Stephenson v. Bartlett*, 355 N.C. 354, 562 S.E.2d 377 (2002) (*Stephenson I*), *Stephenson v. Bartlett*, 357 N.C. 301, 582 S.E.2d 247 (2003) (*Stephenson II*), *Dickson v. Rucho*, 367 N.C. 542, 766 S.E.2d 238 (2014) (*Dickson I*) and *Dickson v. Rucho*, 368 N.C. 481, 781 S.E. 2d 460 (2015) (*Dickson II*). Within county groupings, county lines shall not be traversed except as authorized by *Stephenson I*, *Stephenson II*, *Dickson I*, and *Dickson II*.

  Division of counties in the 2021 Congressional plan shall only be made for reasons of equalizing population and consideration of double bunking. If a county is of sufficient population size to contain an entire congressional district within the county's boundaries, the Committees shall construct a district entirely within that county.

- **Racial Data.** Data identifying the race of individuals or voters *shall not* be used in the construction or consideration of districts in the 2021 Congressional, House, and Senate plans. The Committees will draw districts that comply with the Voting Rights Act.

- **VTDs.** Voting districts ("VTDs") should be split only when necessary.

- **Compactness.** The Committees shall make reasonable efforts to draw legislative districts in the 2021 Congressional, House and Senate plans that are compact. In doing so, the Committee may use as a guide the minimum Reock ("dispersion") and Polsby-Popper ("permiter") scores identified by Richard H. Pildes and Richard G. Neimi in *Expressive Harms, "Bizarre Districts," and Voting Rights: Evaluating Election-District Appearances After Shaw v. Reno*, 92 Mich. L. Rev. 483 (1993).

- **Municipal Boundaries.** The Committees may consider municipal boundaries when drawing districts in the 2021 Congressional, House, and Senate plans.

Joint Meeting of Committees

August 12, 2021

House Committee on Redistricting

Senate Committee on Redistricting and Elections

- **Election Data.** Partisan considerations and election results data *shall not* be used in the drawing of districts in the 2021 Congressional, House, and Senate plans.

- **Member Residence.** Member residence may be considered in the formation of legislative and congressional districts.

- **Community Consideration.** So long as a plan complies with the foregoing criteria, local knowledge of the character of communities and connections between communities may be considered in the formation of legislative and congressional districts.

Exhibit #
Mattingly 4
12/31/21 - MS
exhibitsticker.com

NC General Assembly

Population Deviation Report

District Plan: SL 2021-175 House

District	Seats	Ideal Pop	Actual Pop	Deviation	Deviation %
1	1	86,995	84,330	-2,665	-3.06%
2	1	86,995	90,793	3,798	4.37%
3	1	86,995	85,099	-1,896	-2.18%
4	1	86,995	83,095	-3,900	-4.48%
5	1	86,995	82,953	-4,042	-4.65%
6	1	86,995	87,332	337	0.39%
7	1	86,995	83,510	-3,485	-4.01%
8	1	86,995	85,793	-1,202	-1.38%
9	1	86,995	84,450	-2,545	-2.93%
10	1	86,995	82,953	-4,042	-4.65%
11	1	86,995	86,298	-697	-0.80%
12	1	86,995	84,745	-2,250	-2.59%
13	1	86,995	83,307	-3,688	-4.24%
14	1	86,995	86,538	-457	-0.53%
15	1	86,995	87,578	583	0.67%
16	1	86,995	90,663	3,668	4.22%
17	1	86,995	89,763	2,768	3.18%
18	1	86,995	91,245	4,250	4.89%
19	1	86,995	91,041	4,046	4.65%
20	1	86,995	90,346	3,351	3.85%
21	1	86,995	86,179	-816	-0.94%
22	1	86,995	88,642	1,647	1.89%
23	1	86,995	88,865	1,870	2.15%
24	1	86,995	87,220	225	0.26%
25	1	86,995	86,534	-461	-0.53%
26	1	86,995	89,947	2,952	3.39%
27	1	86,995	84,735	-2,260	-2.60%
28	1	86,995	85,389	-1,606	-1.85%
29	1	86,995	91,212	4,217	4.85%
30	1	86,995	91,165	4,170	4.79%
31	1	86,995	90,760	3,765	4.33%
32	1	86,995	88,633	1,638	1.88%
33	1	86,995	83,049	-3,946	-4.54%
34	1	86,995	83,679	-3,316	-3.81%
35	1	86,995	88,374	1,379	1.59%
36	1	86,995	90,166	3,171	3.65%
37	1	86,995	90,867	3,872	4.45%
38	1	86,995	88,226	1,231	1.42%
39	1	86,995	90,164	3,169	3.64%
40	1	86,995	83,175	-3,820	-4.39%
41	1	86,995	89,887	2,892	3.32%
42	1	86,995	85,537	-1,458	-1.68%
43	1	86,995	82,956	-4,039	-4.64%
44	1	86,995	83,297	-3,698	-4.25%

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Data Source: 2020 Census Redistricting Data (Public Law 94-171) Summary File.

[PL20-Po

NCLCV v. Hall
21 CVS 15426
LDTX197

Population Deviation Report

District Plan: SL 2021-175 House

District	Seats	Ideal Pop	Actual Pop	Deviation	Deviation %
45	1	86,995	82,938	-4,057	-4.66%
46	1	86,995	83,445	-3,550	-4.08%
47	1	86,995	83,708	-3,287	-3.78%
48	1	86,995	86,256	-739	-0.85%
49	1	86,995	86,157	-838	-0.96%
50	1	86,995	85,345	-1,650	-1.90%
51	1	86,995	83,073	-3,922	-4.51%
52	1	86,995	84,383	-2,612	-3.00%
53	1	86,995	86,899	-96	-0.11%
54	1	86,995	83,475	-3,520	-4.05%
55	1	86,995	87,005	10	0.01%
56	1	86,995	86,087	-908	-1.04%
57	1	86,995	90,615	3,620	4.16%
58	1	86,995	90,808	3,813	4.38%
59	1	86,995	90,361	3,366	3.87%
60	1	86,995	89,735	2,740	3.15%
61	1	86,995	90,201	3,206	3.69%
62	1	86,995	89,579	2,584	2.97%
63	1	86,995	86,399	-596	-0.69%
64	1	86,995	85,016	-1,979	-2.27%
65	1	86,995	91,096	4,101	4.71%
66	1	86,995	83,189	-3,806	-4.37%
67	1	86,995	88,255	1,260	1.45%
68	1	86,995	88,138	1,143	1.31%
69	1	86,995	85,179	-1,816	-2.09%
70	1	86,995	89,118	2,123	2.44%
71	1	86,995	84,874	-2,121	-2.44%
72	1	86,995	86,949	-46	-0.05%
73	1	86,995	90,649	3,654	4.20%
74	1	86,995	84,857	-2,138	-2.46%
75	1	86,995	84,220	-2,775	-3.19%
76	1	86,995	89,815	2,820	3.24%
77	1	86,995	90,628	3,633	4.18%
78	1	86,995	86,365	-630	-0.72%
79	1	86,995	83,163	-3,832	-4.40%
80	1	86,995	84,864	-2,131	-2.45%
81	1	86,995	84,066	-2,929	-3.37%
82	1	86,995	90,771	3,776	4.34%
83	1	86,995	90,742	3,747	4.31%
84	1	86,995	86,773	-222	-0.26%
85	1	86,995	90,863	3,868	4.45%
86	1	86,995	87,570	575	0.66%
87	1	86,995	85,758	-1,237	-1.42%
88	1	86,995	82,834	-4,161	-4.78%

Population Deviation Report

District Plan: SL 2021-175 House

District	Seats	Ideal Pop	Actual Pop	Deviation	Deviation %
89	1	86,995	85,577	-1,418	-1.63%
90	1	86,995	82,937	-4,058	-4.66%
91	1	86,995	86,210	-785	-0.90%
92	1	86,995	85,031	-1,964	-2.26%
93	1	86,995	86,445	-550	-0.63%
94	1	86,995	90,835	3,840	4.41%
95	1	86,995	85,366	-1,629	-1.87%
96	1	86,995	89,587	2,592	2.98%
97	1	86,995	86,810	-185	-0.21%
98	1	86,995	86,827	-168	-0.19%
99	1	86,995	87,647	652	0.75%
100	1	86,995	87,197	202	0.23%
101	1	86,995	86,426	-569	-0.65%
102	1	86,995	86,179	-816	-0.94%
103	1	86,995	87,132	137	0.16%
104	1	86,995	86,520	-475	-0.55%
105	1	86,995	85,822	-1,173	-1.35%
106	1	86,995	82,824	-4,171	-4.79%
107	1	86,995	88,237	1,242	1.43%
108	1	86,995	86,263	-732	-0.84%
109	1	86,995	87,762	767	0.88%
110	1	86,995	88,397	1,402	1.61%
111	1	86,995	89,894	2,899	3.33%
112	1	86,995	82,806	-4,189	-4.82%
113	1	86,995	89,058	2,063	2.37%
114	1	86,995	89,685	2,690	3.09%
115	1	86,995	90,262	3,267	3.76%
116	1	86,995	89,505	2,510	2.89%
117	1	86,995	91,035	4,040	4.64%
118	1	86,995	83,282	-3,713	-4.27%
119	1	86,995	90,212	3,217	3.70%
120	1	86,995	84,907	-2,088	-2.40%
Totals:	**120**		**10,439,388**		

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Alamance	63	171,415	86,399	86,399	50.40 %	100.00 %
	64	171,415	85,016	85,016	49.60 %	100.00 %
Alexander	94	36,444	90,835	36,444	100.00 %	40.12 %
Alleghany	93	10,888	86,445	10,888	100.00 %	12.60 %
Anson	55	22,055	87,005	22,055	100.00 %	25.35 %
Ashe	93	26,577	86,445	26,577	100.00 %	30.74 %
Avery	85	17,806	90,863	17,806	100.00 %	19.60 %
Beaufort	79	44,652	83,163	44,652	100.00 %	53.69 %
Bertie	23	17,934	88,865	17,934	100.00 %	20.18 %
Bladen	22	29,606	88,642	29,606	100.00 %	33.40 %
Brunswick	17	136,693	89,763	89,763	65.67 %	100.00 %
	19	136,693	91,041	46,930	34.33 %	51.55 %
Buncombe	114	269,452	89,685	89,685	33.28 %	100.00 %
	115	269,452	90,262	90,262	33.50 %	100.00 %
	116	269,452	89,505	89,505	33.22 %	100.00 %
Burke	86	87,570	87,570	87,570	100.00 %	100.00 %
Cabarrus	73	225,804	90,649	90,649	40.14 %	100.00 %
	82	225,804	90,771	90,771	40.20 %	100.00 %
	83	225,804	90,742	44,384	19.66 %	48.91 %
Caldwell	87	80,652	85,758	80,652	100.00 %	94.05 %
Camden	5	10,355	82,953	10,355	100.00 %	12.48 %
Carteret	13	67,686	83,307	67,686	100.00 %	81.25 %
Caswell	50	22,736	85,345	22,736	100.00 %	26.64 %
Catawba	89	160,610	85,577	71,023	44.22 %	82.99 %
	96	160,610	89,587	89,587	55.78 %	100.00 %
Chatham	54	76,285	83,475	76,285	100.00 %	91.39 %
Cherokee	120	28,774	84,907	28,774	100.00 %	33.89 %
Chowan	1	13,708	84,330	13,708	100.00 %	16.26 %
Clay	120	11,089	84,907	11,089	100.00 %	13.06 %
Cleveland	110	99,519	88,397	34,479	34.65 %	39.00 %
	111	99,519	89,894	65,040	65.35 %	72.35 %
Columbus	46	50,623	83,445	50,623	100.00 %	60.67 %
Craven	3	100,720	85,099	85,099	84.49 %	100.00 %
	13	100,720	83,307	15,621	15.51 %	18.75 %
Cumberland	42	334,728	85,537	85,537	25.55 %	100.00 %
	43	334,728	82,956	82,956	24.78 %	100.00 %
	44	334,728	83,297	83,297	24.88 %	100.00 %
	45	334,728	82,938	82,938	24.78 %	100.00 %
Currituck	1	28,100	84,330	28,100	100.00 %	33.32 %
Dare	1	36,915	84,330	15,269	41.36 %	18.11 %
	79	36,915	83,163	21,646	58.64 %	26.03 %

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Davidson	80	168,930	84,864	84,864	50.24 %	100.00 %
	81	168,930	84,066	84,066	49.76 %	100.00 %
Davie	77	42,712	90,628	42,712	100.00 %	47.13 %
Duplin	4	48,715	83,095	48,715	100.00 %	58.63 %
Durham	2	324,833	90,793	51,696	15.91 %	56.94 %
	29	324,833	91,212	91,212	28.08 %	100.00 %
	30	324,833	91,165	91,165	28.07 %	100.00 %
	31	324,833	90,760	90,760	27.94 %	100.00 %
Edgecombe	23	48,900	88,865	48,900	100.00 %	55.03 %
Forsyth	71	382,590	84,874	84,874	22.18 %	100.00 %
	72	382,590	86,949	86,949	22.73 %	100.00 %
	74	382,590	84,857	84,857	22.18 %	100.00 %
	75	382,590	84,220	84,220	22.01 %	100.00 %
	91	382,590	86,210	41,690	10.90 %	48.36 %
Franklin	7	68,573	83,510	68,573	100.00 %	82.11 %
Gaston	108	227,943	86,263	86,263	37.84 %	100.00 %
	109	227,943	87,762	87,762	38.50 %	100.00 %
	110	227,943	88,397	53,918	23.65 %	61.00 %
Gates	5	10,478	82,953	10,478	100.00 %	12.63 %
Graham	120	8,030	84,907	8,030	100.00 %	9.46 %
Granville	7	60,992	83,510	14,937	24.49 %	17.89 %
	32	60,992	88,633	46,055	75.51 %	51.96 %
Greene	12	20,451	84,745	20,451	100.00 %	24.13 %
Guilford	57	541,299	90,615	90,615	16.74 %	100.00 %
	58	541,299	90,808	90,808	16.78 %	100.00 %
	59	541,299	90,361	90,361	16.69 %	100.00 %
	60	541,299	89,735	89,735	16.58 %	100.00 %
	61	541,299	90,201	90,201	16.66 %	100.00 %
	62	541,299	89,579	89,579	16.55 %	100.00 %
Halifax	27	48,622	84,735	48,622	100.00 %	57.38 %
Harnett	6	133,568	87,332	87,332	65.38 %	100.00 %
	53	133,568	86,899	46,236	34.62 %	53.21 %
Haywood	118	62,089	83,282	62,089	100.00 %	74.55 %
Henderson	113	116,281	89,058	25,246	21.71 %	28.35 %
	117	116,281	91,035	91,035	78.29 %	100.00 %
Hertford	5	21,552	82,953	21,552	100.00 %	25.98 %
Hoke	48	52,082	86,256	52,082	100.00 %	60.38 %
Hyde	79	4,589	83,163	4,589	100.00 %	5.52 %
Iredell	84	186,693	86,773	86,773	46.48 %	100.00 %
	89	186,693	85,577	14,554	7.80 %	17.01 %
	95	186,693	85,366	85,366	45.73 %	100.00 %
Jackson	119	43,109	90,212	43,109	100.00 %	47.79 %

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Johnston	26	215,999	89,947	89,947	41.64 %	100.00 %
	28	215,999	85,389	85,389	39.53 %	100.00 %
	53	215,999	86,899	40,663	18.83 %	46.79 %
Jones	12	9,172	84,745	9,172	100.00 %	10.82 %
Lee	51	63,285	83,073	63,285	100.00 %	76.18 %
Lenoir	12	55,122	84,745	55,122	100.00 %	65.04 %
Lincoln	97	86,810	86,810	86,810	100.00 %	100.00 %
Macon	120	37,014	84,907	37,014	100.00 %	43.59 %
Madison	118	21,193	83,282	21,193	100.00 %	25.45 %
Martin	23	22,031	88,865	22,031	100.00 %	24.79 %
McDowell	85	44,578	90,863	39,684	89.02 %	43.67 %
	113	44,578	89,058	4,894	10.98 %	5.50 %
Mecklenburg	88	1,115,482	82,834	82,834	7.43 %	100.00 %
	92	1,115,482	85,031	85,031	7.62 %	100.00 %
	98	1,115,482	86,827	86,827	7.78 %	100.00 %
	99	1,115,482	87,647	87,647	7.86 %	100.00 %
	100	1,115,482	87,197	87,197	7.82 %	100.00 %
	101	1,115,482	86,426	86,426	7.75 %	100.00 %
	102	1,115,482	86,179	86,179	7.73 %	100.00 %
	103	1,115,482	87,132	87,132	7.81 %	100.00 %
	104	1,115,482	86,520	86,520	7.76 %	100.00 %
	105	1,115,482	85,822	85,822	7.69 %	100.00 %
	106	1,115,482	82,824	82,824	7.42 %	100.00 %
	107	1,115,482	88,237	88,237	7.91 %	100.00 %
	112	1,115,482	82,806	82,806	7.42 %	100.00 %
Mitchell	85	14,903	90,863	14,903	100.00 %	16.40 %
Montgomery	67	25,751	88,255	25,751	100.00 %	29.18 %
Moore	51	99,727	83,073	19,788	19.84 %	23.82 %
	52	99,727	84,383	41,437	41.55 %	49.11 %
	78	99,727	86,365	38,502	38.61 %	44.58 %
Nash	24	94,970	87,220	8,436	8.88 %	9.67 %
	25	94,970	86,534	86,534	91.12 %	100.00 %
New Hanover	18	225,702	91,245	91,245	40.43 %	100.00 %
	19	225,702	91,041	44,111	19.54 %	48.45 %
	20	225,702	90,346	90,346	40.03 %	100.00 %
Northampton	27	17,471	84,735	17,471	100.00 %	20.62 %
Onslow	14	204,576	86,538	86,538	42.30 %	100.00 %
	15	204,576	87,578	87,578	42.81 %	100.00 %
	16	204,576	90,663	30,460	14.89 %	33.60 %
Orange	50	148,696	85,345	62,609	42.11 %	73.36 %
	56	148,696	86,087	86,087	57.89 %	100.00 %
Pamlico	79	12,276	83,163	12,276	100.00 %	14.76 %

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Pasquotank	5	40,568	82,953	40,568	100.00 %	48.90 %
Pender	16	60,203	90,663	60,203	100.00 %	66.40 %
Perquimans	1	13,005	84,330	13,005	100.00 %	15.42 %
Person	2	39,097	90,793	39,097	100.00 %	43.06 %
Pitt	8	170,243	85,793	85,793	50.39 %	100.00 %
	9	170,243	84,450	84,450	49.61 %	100.00 %
Polk	113	19,328	89,058	19,328	100.00 %	21.70 %
Randolph	54	144,171	83,475	7,190	4.99 %	8.61 %
	70	144,171	89,118	89,118	61.81 %	100.00 %
	78	144,171	86,365	47,863	33.20 %	55.42 %
Richmond	52	42,946	84,383	42,946	100.00 %	50.89 %
Robeson	46	116,530	83,445	32,822	28.17 %	39.33 %
	47	116,530	83,708	83,708	71.83 %	100.00 %
Rockingham	65	91,096	91,096	91,096	100.00 %	100.00 %
Rowan	76	146,875	89,815	89,815	61.15 %	100.00 %
	77	146,875	90,628	10,702	7.29 %	11.81 %
	83	146,875	90,742	46,358	31.56 %	51.09 %
Rutherford	111	64,444	89,894	24,854	38.57 %	27.65 %
	113	64,444	89,058	39,590	61.43 %	44.45 %
Sampson	22	59,036	88,642	59,036	100.00 %	66.60 %
Scotland	48	34,174	86,256	34,174	100.00 %	39.62 %
Stanly	67	62,504	88,255	62,504	100.00 %	70.82 %
Stokes	91	44,520	86,210	44,520	100.00 %	51.64 %
Surry	90	71,359	82,937	71,359	100.00 %	86.04 %
Swain	119	14,117	90,212	14,117	100.00 %	15.65 %
Transylvania	119	32,986	90,212	32,986	100.00 %	36.56 %
Tyrrell	1	3,245	84,330	3,245	100.00 %	3.85 %
Union	55	238,267	87,005	64,950	27.26 %	74.65 %
	68	238,267	88,138	88,138	36.99 %	100.00 %
	69	238,267	85,179	85,179	35.75 %	100.00 %
Vance	32	42,578	88,633	42,578	100.00 %	48.04 %

County - District Report

District Plan: SL 2021-175 House

County	District	Total County Population	Total District Population	County Pop in District	Percent of County Pop in District	Percent of District Pop in County
Wake	11	1,129,410	86,298	86,298	7.64 %	100.00 %
	21	1,129,410	86,179	86,179	7.63 %	100.00 %
	33	1,129,410	83,049	83,049	7.35 %	100.00 %
	34	1,129,410	83,679	83,679	7.41 %	100.00 %
	35	1,129,410	88,374	88,374	7.82 %	100.00 %
	36	1,129,410	90,166	90,166	7.98 %	100.00 %
	37	1,129,410	90,867	90,867	8.05 %	100.00 %
	38	1,129,410	88,226	88,226	7.81 %	100.00 %
	39	1,129,410	90,164	90,164	7.98 %	100.00 %
	40	1,129,410	83,175	83,175	7.36 %	100.00 %
	41	1,129,410	89,887	89,887	7.96 %	100.00 %
	49	1,129,410	86,157	86,157	7.63 %	100.00 %
	66	1,129,410	83,189	83,189	7.37 %	100.00 %
Warren	27	18,642	84,735	18,642	100.00 %	22.00 %
Washington	1	11,003	84,330	11,003	100.00 %	13.05 %
Watauga	87	54,086	85,758	5,106	9.44 %	5.95 %
	93	54,086	86,445	48,980	90.56 %	56.66 %
Wayne	4	117,333	83,095	34,380	29.30 %	41.37 %
	10	117,333	82,953	82,953	70.70 %	100.00 %
Wilkes	90	65,969	82,937	11,578	17.55 %	13.96 %
	94	65,969	90,835	54,391	82.45 %	59.88 %
Wilson	24	78,784	87,220	78,784	100.00 %	90.33 %
Yadkin	77	37,214	90,628	37,214	100.00 %	41.06 %
Yancey	85	18,470	90,863	18,470	100.00 %	20.33 %
			Total:	**10,439,388**		

Number of split counties: 36
Display: all counties

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
1	Chowan	84,330	13,708	13,708	16.26 %	100.00 %
	Currituck	84,330	28,100	28,100	33.32 %	100.00 %
	Dare	84,330	36,915	15,269	18.11 %	41.36 %
	Perquimans	84,330	13,005	13,005	15.42 %	100.00 %
	Tyrrell	84,330	3,245	3,245	3.85 %	100.00 %
	Washington	84,330	11,003	11,003	13.05 %	100.00 %
2	Durham	90,793	324,833	51,696	56.94 %	15.91 %
	Person	90,793	39,097	39,097	43.06 %	100.00 %
3	Craven	85,099	100,720	85,099	100.00 %	84.49 %
4	Duplin	83,095	48,715	48,715	58.63 %	100.00 %
	Wayne	83,095	117,333	34,380	41.37 %	29.30 %
5	Camden	82,953	10,355	10,355	12.48 %	100.00 %
	Gates	82,953	10,478	10,478	12.63 %	100.00 %
	Hertford	82,953	21,552	21,552	25.98 %	100.00 %
	Pasquotank	82,953	40,568	40,568	48.90 %	100.00 %
6	Harnett	87,332	133,568	87,332	100.00 %	65.38 %
7	Franklin	83,510	68,573	68,573	82.11 %	100.00 %
	Granville	83,510	60,992	14,937	17.89 %	24.49 %
8	Pitt	85,793	170,243	85,793	100.00 %	50.39 %
9	Pitt	84,450	170,243	84,450	100.00 %	49.61 %
10	Wayne	82,953	117,333	82,953	100.00 %	70.70 %
11	Wake	86,298	1,129,410	86,298	100.00 %	7.64 %
12	Greene	84,745	20,451	20,451	24.13 %	100.00 %
	Jones	84,745	9,172	9,172	10.82 %	100.00 %
	Lenoir	84,745	55,122	55,122	65.04 %	100.00 %
13	Carteret	83,307	67,686	67,686	81.25 %	100.00 %
	Craven	83,307	100,720	15,621	18.75 %	15.51 %
14	Onslow	86,538	204,576	86,538	100.00 %	42.30 %
15	Onslow	87,578	204,576	87,578	100.00 %	42.81 %
16	Onslow	90,663	204,576	30,460	33.60 %	14.89 %
	Pender	90,663	60,203	60,203	66.40 %	100.00 %
17	Brunswick	89,763	136,693	89,763	100.00 %	65.67 %
18	New Hanover	91,245	225,702	91,245	100.00 %	40.43 %
19	Brunswick	91,041	136,693	46,930	51.55 %	34.33 %
	New Hanover	91,041	225,702	44,111	48.45 %	19.54 %
20	New Hanover	90,346	225,702	90,346	100.00 %	40.03 %
21	Wake	86,179	1,129,410	86,179	100.00 %	7.63 %
22	Bladen	88,642	29,606	29,606	33.40 %	100.00 %
	Sampson	88,642	59,036	59,036	66.60 %	100.00 %
23	Bertie	88,865	17,934	17,934	20.18 %	100.00 %
	Edgecombe	88,865	48,900	48,900	55.03 %	100.00 %
	Martin	88,865	22,031	22,031	24.79 %	100.00 %

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
24	Nash	87,220	94,970	8,436	9.67 %	8.88 %
	Wilson	87,220	78,784	78,784	90.33 %	100.00 %
25	Nash	86,534	94,970	86,534	100.00 %	91.12 %
26	Johnston	89,947	215,999	89,947	100.00 %	41.64 %
27	Halifax	84,735	48,622	48,622	57.38 %	100.00 %
	Northampton	84,735	17,471	17,471	20.62 %	100.00 %
	Warren	84,735	18,642	18,642	22.00 %	100.00 %
28	Johnston	85,389	215,999	85,389	100.00 %	39.53 %
29	Durham	91,212	324,833	91,212	100.00 %	28.08 %
30	Durham	91,165	324,833	91,165	100.00 %	28.07 %
31	Durham	90,760	324,833	90,760	100.00 %	27.94 %
32	Granville	88,633	60,992	46,055	51.96 %	75.51 %
	Vance	88,633	42,578	42,578	48.04 %	100.00 %
33	Wake	83,049	1,129,410	83,049	100.00 %	7.35 %
34	Wake	83,679	1,129,410	83,679	100.00 %	7.41 %
35	Wake	88,374	1,129,410	88,374	100.00 %	7.82 %
36	Wake	90,166	1,129,410	90,166	100.00 %	7.98 %
37	Wake	90,867	1,129,410	90,867	100.00 %	8.05 %
38	Wake	88,226	1,129,410	88,226	100.00 %	7.81 %
39	Wake	90,164	1,129,410	90,164	100.00 %	7.98 %
40	Wake	83,175	1,129,410	83,175	100.00 %	7.36 %
41	Wake	89,887	1,129,410	89,887	100.00 %	7.96 %
42	Cumberland	85,537	334,728	85,537	100.00 %	25.55 %
43	Cumberland	82,956	334,728	82,956	100.00 %	24.78 %
44	Cumberland	83,297	334,728	83,297	100.00 %	24.88 %
45	Cumberland	82,938	334,728	82,938	100.00 %	24.78 %
46	Columbus	83,445	50,623	50,623	60.67 %	100.00 %
	Robeson	83,445	116,530	32,822	39.33 %	28.17 %
47	Robeson	83,708	116,530	83,708	100.00 %	71.83 %
48	Hoke	86,256	52,082	52,082	60.38 %	100.00 %
	Scotland	86,256	34,174	34,174	39.62 %	100.00 %
49	Wake	86,157	1,129,410	86,157	100.00 %	7.63 %
50	Caswell	85,345	22,736	22,736	26.64 %	100.00 %
	Orange	85,345	148,696	62,609	73.36 %	42.11 %
51	Lee	83,073	63,285	63,285	76.18 %	100.00 %
	Moore	83,073	99,727	19,788	23.82 %	19.84 %
52	Moore	84,383	99,727	41,437	49.11 %	41.55 %
	Richmond	84,383	42,946	42,946	50.89 %	100.00 %
53	Harnett	86,899	133,568	46,236	53.21 %	34.62 %
	Johnston	86,899	215,999	40,663	46.79 %	18.83 %
54	Chatham	83,475	76,285	76,285	91.39 %	100.00 %
	Randolph	83,475	144,171	7,190	8.61 %	4.99 %

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
55	Anson	87,005	22,055	22,055	25.35 %	100.00 %
	Union	87,005	238,267	64,950	74.65 %	27.26 %
56	Orange	86,087	148,696	86,087	100.00 %	57.89 %
57	Guilford	90,615	541,299	90,615	100.00 %	16.74 %
58	Guilford	90,808	541,299	90,808	100.00 %	16.78 %
59	Guilford	90,361	541,299	90,361	100.00 %	16.69 %
60	Guilford	89,735	541,299	89,735	100.00 %	16.58 %
61	Guilford	90,201	541,299	90,201	100.00 %	16.66 %
62	Guilford	89,579	541,299	89,579	100.00 %	16.55 %
63	Alamance	86,399	171,415	86,399	100.00 %	50.40 %
64	Alamance	85,016	171,415	85,016	100.00 %	49.60 %
65	Rockingham	91,096	91,096	91,096	100.00 %	100.00 %
66	Wake	83,189	1,129,410	83,189	100.00 %	7.37 %
67	Montgomery	88,255	25,751	25,751	29.18 %	100.00 %
	Stanly	88,255	62,504	62,504	70.82 %	100.00 %
68	Union	88,138	238,267	88,138	100.00 %	36.99 %
69	Union	85,179	238,267	85,179	100.00 %	35.75 %
70	Randolph	89,118	144,171	89,118	100.00 %	61.81 %
71	Forsyth	84,874	382,590	84,874	100.00 %	22.18 %
72	Forsyth	86,949	382,590	86,949	100.00 %	22.73 %
73	Cabarrus	90,649	225,804	90,649	100.00 %	40.14 %
74	Forsyth	84,857	382,590	84,857	100.00 %	22.18 %
75	Forsyth	84,220	382,590	84,220	100.00 %	22.01 %
76	Rowan	89,815	146,875	89,815	100.00 %	61.15 %
77	Davie	90,628	42,712	42,712	47.13 %	100.00 %
	Rowan	90,628	146,875	10,702	11.81 %	7.29 %
	Yadkin	90,628	37,214	37,214	41.06 %	100.00 %
78	Moore	86,365	99,727	38,502	44.58 %	38.61 %
	Randolph	86,365	144,171	47,863	55.42 %	33.20 %
79	Beaufort	83,163	44,652	44,652	53.69 %	100.00 %
	Dare	83,163	36,915	21,646	26.03 %	58.64 %
	Hyde	83,163	4,589	4,589	5.52 %	100.00 %
	Pamlico	83,163	12,276	12,276	14.76 %	100.00 %
80	Davidson	84,864	168,930	84,864	100.00 %	50.24 %
81	Davidson	84,066	168,930	84,066	100.00 %	49.76 %
82	Cabarrus	90,771	225,804	90,771	100.00 %	40.20 %
83	Cabarrus	90,742	225,804	44,384	48.91 %	19.66 %
	Rowan	90,742	146,875	46,358	51.09 %	31.56 %
84	Iredell	86,773	186,693	86,773	100.00 %	46.48 %

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
85	Avery	90,863	17,806	17,806	19.60 %	100.00 %
	McDowell	90,863	44,578	39,684	43.67 %	89.02 %
	Mitchell	90,863	14,903	14,903	16.40 %	100.00 %
	Yancey	90,863	18,470	18,470	20.33 %	100.00 %
86	Burke	87,570	87,570	87,570	100.00 %	100.00 %
87	Caldwell	85,758	80,652	80,652	94.05 %	100.00 %
	Watauga	85,758	54,086	5,106	5.95 %	9.44 %
88	Mecklenburg	82,834	1,115,482	82,834	100.00 %	7.43 %
89	Catawba	85,577	160,610	71,023	82.99 %	44.22 %
	Iredell	85,577	186,693	14,554	17.01 %	7.80 %
90	Surry	82,937	71,359	71,359	86.04 %	100.00 %
	Wilkes	82,937	65,969	11,578	13.96 %	17.55 %
91	Forsyth	86,210	382,590	41,690	48.36 %	10.90 %
	Stokes	86,210	44,520	44,520	51.64 %	100.00 %
92	Mecklenburg	85,031	1,115,482	85,031	100.00 %	7.62 %
93	Alleghany	86,445	10,888	10,888	12.60 %	100.00 %
	Ashe	86,445	26,577	26,577	30.74 %	100.00 %
	Watauga	86,445	54,086	48,980	56.66 %	90.56 %
94	Alexander	90,835	36,444	36,444	40.12 %	100.00 %
	Wilkes	90,835	65,969	54,391	59.88 %	82.45 %
95	Iredell	85,366	186,693	85,366	100.00 %	45.73 %
96	Catawba	89,587	160,610	89,587	100.00 %	55.78 %
97	Lincoln	86,810	86,810	86,810	100.00 %	100.00 %
98	Mecklenburg	86,827	1,115,482	86,827	100.00 %	7.78 %
99	Mecklenburg	87,647	1,115,482	87,647	100.00 %	7.86 %
100	Mecklenburg	87,197	1,115,482	87,197	100.00 %	7.82 %
101	Mecklenburg	86,426	1,115,482	86,426	100.00 %	7.75 %
102	Mecklenburg	86,179	1,115,482	86,179	100.00 %	7.73 %
103	Mecklenburg	87,132	1,115,482	87,132	100.00 %	7.81 %
104	Mecklenburg	86,520	1,115,482	86,520	100.00 %	7.76 %
105	Mecklenburg	85,822	1,115,482	85,822	100.00 %	7.69 %
106	Mecklenburg	82,824	1,115,482	82,824	100.00 %	7.42 %
107	Mecklenburg	88,237	1,115,482	88,237	100.00 %	7.91 %
108	Gaston	86,263	227,943	86,263	100.00 %	37.84 %
109	Gaston	87,762	227,943	87,762	100.00 %	38.50 %
110	Cleveland	88,397	99,519	34,479	39.00 %	34.65 %
	Gaston	88,397	227,943	53,918	61.00 %	23.65 %
111	Cleveland	89,894	99,519	65,040	72.35 %	65.35 %
	Rutherford	89,894	64,444	24,854	27.65 %	38.57 %
112	Mecklenburg	82,806	1,115,482	82,806	100.00 %	7.42 %

District - County Report

District Plan: SL 2021-175 House

District	County	Total District Population	Total County Population	District Pop in County	Percent of District Pop in County	Percent of County Pop in District
113	Henderson	89,058	116,281	25,246	28.35 %	21.71 %
	McDowell	89,058	44,578	4,894	5.50 %	10.98 %
	Polk	89,058	19,328	19,328	21.70 %	100.00 %
	Rutherford	89,058	64,444	39,590	44.45 %	61.43 %
114	Buncombe	89,685	269,452	89,685	100.00 %	33.28 %
115	Buncombe	90,262	269,452	90,262	100.00 %	33.50 %
116	Buncombe	89,505	269,452	89,505	100.00 %	33.22 %
117	Henderson	91,035	116,281	91,035	100.00 %	78.29 %
118	Haywood	83,282	62,089	62,089	74.55 %	100.00 %
	Madison	83,282	21,193	21,193	25.45 %	100.00 %
119	Jackson	90,212	43,109	43,109	47.79 %	100.00 %
	Swain	90,212	14,117	14,117	15.65 %	100.00 %
	Transylvania	90,212	32,986	32,986	36.56 %	100.00 %
120	Cherokee	84,907	28,774	28,774	33.89 %	100.00 %
	Clay	84,907	11,089	11,089	13.06 %	100.00 %
	Graham	84,907	8,030	8,030	9.46 %	100.00 %
	Macon	84,907	37,014	37,014	43.59 %	100.00 %
			Total:	**10,439,388**		

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Aberdeen	52	8,516	84,383	8,516	100.00 %	10.09 %
	78	8,516	86,365	0	0.00 %	0.00 %
Ahoskie	5	4,891	82,953	4,891	100.00 %	5.90 %
Alamance	64	988	85,016	988	100.00 %	1.16 %
Albemarle	67	16,432	88,255	16,432	100.00 %	18.62 %
Alliance	79	733	83,163	733	100.00 %	0.88 %
Andrews	120	1,667	84,907	1,667	100.00 %	1.96 %
Angier	6	5,265	87,332	4,709	89.44 %	5.39 %
	37	5,265	90,867	556	10.56 %	0.61 %
Ansonville	55	440	87,005	440	100.00 %	0.51 %
Apex	11	58,780	86,298	0	0.00 %	0.00 %
	21	58,780	86,179	556	0.95 %	0.65 %
	36	58,780	90,166	57,843	98.41 %	64.15 %
	41	58,780	89,887	381	0.65 %	0.42 %
Arapahoe	79	416	83,163	416	100.00 %	0.50 %
Archdale	60	11,907	89,735	380	3.19 %	0.42 %
	70	11,907	89,118	11,527	96.81 %	12.93 %
Archer Lodge	26	4,797	89,947	4,797	100.00 %	5.33 %
Asheboro	70	27,156	89,118	25,890	95.34 %	29.05 %
	78	27,156	86,365	1,266	4.66 %	1.47 %
Asheville	114	94,589	89,685	52,596	55.60 %	58.65 %
	115	94,589	90,262	29,236	30.91 %	32.39 %
	116	94,589	89,505	12,757	13.49 %	14.25 %
Askewville	23	184	88,865	184	100.00 %	0.21 %
Atkinson	16	296	90,663	296	100.00 %	0.33 %
Atlantic Beach	13	1,364	83,307	1,364	100.00 %	1.64 %
Aulander	23	763	88,865	763	100.00 %	0.86 %
Aurora	79	455	83,163	455	100.00 %	0.55 %
Autryville	22	167	88,642	167	100.00 %	0.19 %
Ayden	9	4,977	84,450	4,977	100.00 %	5.89 %
Badin	67	2,024	88,255	2,024	100.00 %	2.29 %
Bailey	24	568	87,220	568	100.00 %	0.65 %
Bakersville	85	450	90,863	450	100.00 %	0.50 %
Bald Head Island	19	268	91,041	268	100.00 %	0.29 %
Banner Elk	85	1,049	90,863	1,049	100.00 %	1.15 %
Bath	79	245	83,163	245	100.00 %	0.29 %
Bayboro	79	1,161	83,163	1,161	100.00 %	1.40 %
Bear Grass	23	89	88,865	89	100.00 %	0.10 %
Beaufort	13	4,464	83,307	4,464	100.00 %	5.36 %
Beech Mountain	85	675	90,863	62	9.19 %	0.07 %
	93	675	86,445	613	90.81 %	0.71 %
Belhaven	79	1,410	83,163	1,410	100.00 %	1.70 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Belmont	108	15,010	86,263	1,868	12.45 %	2.17 %
	109	15,010	87,762	13,142	87.55 %	14.97 %
Belville	17	2,406	89,763	2,406	100.00 %	2.68 %
Belwood	110	857	88,397	857	100.00 %	0.97 %
Benson	28	3,967	85,389	3,967	100.00 %	4.65 %
	53	3,967	86,899	0	0.00 %	0.00 %
Bermuda Run	77	3,120	90,628	3,120	100.00 %	3.44 %
Bessemer City	110	5,428	88,397	5,428	100.00 %	6.14 %
Bethania	74	344	84,857	0	0.00 %	0.00 %
	91	344	86,210	344	100.00 %	0.40 %
Bethel	8	1,373	85,793	1,373	100.00 %	1.60 %
Beulaville	4	1,116	83,095	1,116	100.00 %	1.34 %
Biltmore Forest	116	1,409	89,505	1,409	100.00 %	1.57 %
Biscoe	67	1,848	88,255	1,848	100.00 %	2.09 %
Black Creek	24	692	87,220	692	100.00 %	0.79 %
Black Mountain	115	8,426	90,262	8,426	100.00 %	9.34 %
Bladenboro	22	1,648	88,642	1,648	100.00 %	1.86 %
Blowing Rock	87	1,376	85,758	96	6.98 %	0.11 %
	93	1,376	86,445	1,280	93.02 %	1.48 %
Boardman	46	166	83,445	166	100.00 %	0.20 %
Bogue	13	695	83,307	695	100.00 %	0.83 %
Boiling Spring Lakes	19	5,943	91,041	5,943	100.00 %	6.53 %
Boiling Springs	111	4,615	89,894	4,615	100.00 %	5.13 %
Bolivia	19	149	91,041	149	100.00 %	0.16 %
Bolton	46	519	83,445	519	100.00 %	0.62 %
Boone	87	19,092	85,758	595	3.12 %	0.69 %
	93	19,092	86,445	18,497	96.88 %	21.40 %
Boonville	77	1,185	90,628	1,185	100.00 %	1.31 %
Bostic	111	355	89,894	355	100.00 %	0.39 %
Brevard	119	7,744	90,212	7,744	100.00 %	8.58 %
Bridgeton	3	349	85,099	349	100.00 %	0.41 %
Broadway	6	1,267	87,332	0	0.00 %	0.00 %
	51	1,267	83,073	1,267	100.00 %	1.53 %
Brookford	96	442	89,587	442	100.00 %	0.49 %
Brunswick	46	973	83,445	973	100.00 %	1.17 %
Bryson City	119	1,558	90,212	1,558	100.00 %	1.73 %
Bunn	7	327	83,510	327	100.00 %	0.39 %
Burgaw	16	3,088	90,663	3,088	100.00 %	3.41 %
Burlington	59	57,303	90,361	1,822	3.18 %	2.02 %
	63	57,303	86,399	25,917	45.23 %	30.00 %
	64	57,303	85,016	29,564	51.59 %	34.77 %
Burnsville	85	1,614	90,863	1,614	100.00 %	1.78 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Butner	32	8,397	88,633	8,397	100.00 %	9.47 %
Cajah's Mountain	87	2,722	85,758	2,722	100.00 %	3.17 %
Calabash	17	2,011	89,763	2,011	100.00 %	2.24 %
Calypso	4	327	83,095	327	100.00 %	0.39 %
Cameron	51	244	83,073	244	100.00 %	0.29 %
Candor	67	813	88,255	813	100.00 %	0.92 %
	78	813	86,365	0	0.00 %	0.00 %
Canton	118	4,422	83,282	4,422	100.00 %	5.31 %
Cape Carteret	13	2,224	83,307	2,224	100.00 %	2.67 %
Carolina Beach	19	6,564	91,041	6,564	100.00 %	7.21 %
Carolina Shores	17	4,588	89,763	4,588	100.00 %	5.11 %
Carrboro	50	21,295	85,345	174	0.82 %	0.20 %
	56	21,295	86,087	21,121	99.18 %	24.53 %
Carthage	51	2,775	83,073	2,747	98.99 %	3.31 %
	52	2,775	84,383	28	1.01 %	0.03 %
Cary	11	174,721	86,298	43,537	24.92 %	50.45 %
	21	174,721	86,179	30,622	17.53 %	35.53 %
	36	174,721	90,166	0	0.00 %	0.00 %
	37	174,721	90,867	2,012	1.15 %	2.21 %
	41	174,721	89,887	74,074	42.40 %	82.41 %
	49	174,721	86,157	20,767	11.89 %	24.10 %
	54	174,721	83,475	3,709	2.12 %	4.44 %
Casar	110	305	88,397	305	100.00 %	0.35 %
Castalia	25	264	86,534	264	100.00 %	0.31 %
Caswell Beach	19	395	91,041	395	100.00 %	0.43 %
Catawba	89	702	85,577	702	100.00 %	0.82 %
Cedar Point	13	1,764	83,307	1,764	100.00 %	2.12 %
Cedar Rock	87	301	85,758	301	100.00 %	0.35 %
Cerro Gordo	46	131	83,445	131	100.00 %	0.16 %
Chadbourn	46	1,574	83,445	1,574	100.00 %	1.89 %
Chapel Hill	29	61,960	91,212	2,906	4.69 %	3.19 %
	56	61,960	86,087	59,054	95.31 %	68.60 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Charlotte	88	874,579	82,834	82,834	9.47 %	100.00 %
	92	874,579	85,031	63,762	7.29 %	74.99 %
	99	874,579	87,647	79,113	9.05 %	90.26 %
	100	874,579	87,197	87,197	9.97 %	100.00 %
	101	874,579	86,426	64,526	7.38 %	74.66 %
	102	874,579	86,179	86,179	9.85 %	100.00 %
	103	874,579	87,132	23,590	2.70 %	27.07 %
	104	874,579	86,520	86,520	9.89 %	100.00 %
	105	874,579	85,822	71,156	8.14 %	82.91 %
	106	874,579	82,824	79,717	9.11 %	96.25 %
	107	874,579	88,237	67,298	7.69 %	76.27 %
	112	874,579	82,806	82,687	9.45 %	99.86 %
Cherryville	110	6,078	88,397	6,078	100.00 %	6.88 %
Chimney Rock Village	113	140	89,058	140	100.00 %	0.16 %
China Grove	83	4,434	90,742	4,434	100.00 %	4.89 %
Chocowinity	79	722	83,163	722	100.00 %	0.87 %
Claremont	89	1,692	85,577	1,692	100.00 %	1.98 %
Clarkton	22	614	88,642	614	100.00 %	0.69 %
Clayton	26	26,307	89,947	26,307	100.00 %	29.25 %
	38	26,307	88,226	0	0.00 %	0.00 %
	39	26,307	90,164	0	0.00 %	0.00 %
Clemmons	74	21,163	84,857	21,163	100.00 %	24.94 %
Cleveland	77	846	90,628	846	100.00 %	0.93 %
Clinton	22	8,383	88,642	8,383	100.00 %	9.46 %
Clyde	118	1,368	83,282	1,368	100.00 %	1.64 %
Coats	53	2,155	86,899	2,155	100.00 %	2.48 %
Cofield	5	267	82,953	267	100.00 %	0.32 %
Colerain	23	217	88,865	217	100.00 %	0.24 %
Columbia	1	610	84,330	610	100.00 %	0.72 %
Columbus	113	1,060	89,058	1,060	100.00 %	1.19 %
Como	5	67	82,953	67	100.00 %	0.08 %
Concord	73	105,240	90,649	32,447	30.83 %	35.79 %
	82	105,240	90,771	48,723	46.30 %	53.68 %
	83	105,240	90,742	24,070	22.87 %	26.53 %
Conetoe	23	198	88,865	198	100.00 %	0.22 %
Connelly Springs	86	1,529	87,570	1,529	100.00 %	1.75 %
Conover	89	8,421	85,577	424	5.04 %	0.50 %
	96	8,421	89,587	7,997	94.96 %	8.93 %
Conway	27	752	84,735	752	100.00 %	0.89 %
Cooleemee	77	940	90,628	940	100.00 %	1.04 %
Cornelius	98	31,412	86,827	31,412	100.00 %	36.18 %
Cove City	3	378	85,099	378	100.00 %	0.44 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Cramerton	108	5,296	86,263	96	1.81 %	0.11 %
	109	5,296	87,762	5,200	98.19 %	5.93 %
Creedmoor	7	4,866	83,510	2,065	42.44 %	2.47 %
	32	4,866	88,633	2,801	57.56 %	3.16 %
Creswell	1	207	84,330	207	100.00 %	0.25 %
Crossnore	85	143	90,863	143	100.00 %	0.16 %
Dallas	110	5,927	88,397	5,927	100.00 %	6.70 %
Danbury	91	189	86,210	189	100.00 %	0.22 %
Davidson	95	15,106	85,366	378	2.50 %	0.44 %
	98	15,106	86,827	14,728	97.50 %	16.96 %
Dellview	110	6	88,397	6	100.00 %	0.01 %
Denton	80	1,494	84,864	1,494	100.00 %	1.76 %
Dillsboro	119	213	90,212	213	100.00 %	0.24 %
Dobbins Heights	52	687	84,383	687	100.00 %	0.81 %
Dobson	90	1,462	82,937	1,462	100.00 %	1.76 %
Dortches	25	1,082	86,534	1,082	100.00 %	1.25 %
Dover	3	349	85,099	349	100.00 %	0.41 %
Drexel	86	1,760	87,570	1,760	100.00 %	2.01 %
Dublin	22	267	88,642	267	100.00 %	0.30 %
Duck	1	742	84,330	742	100.00 %	0.88 %
Dunn	53	8,446	86,899	8,446	100.00 %	9.72 %
Durham	2	283,506	90,793	25,167	8.88 %	27.72 %
	29	283,506	91,212	87,035	30.70 %	95.42 %
	30	283,506	91,165	89,671	31.63 %	98.36 %
	31	283,506	90,760	81,220	28.65 %	89.49 %
	40	283,506	83,175	269	0.09 %	0.32 %
	49	283,506	86,157	0	0.00 %	0.00 %
	50	283,506	85,345	144	0.05 %	0.17 %
Earl	111	198	89,894	198	100.00 %	0.22 %
East Arcadia	22	418	88,642	418	100.00 %	0.47 %
East Bend	77	634	90,628	634	100.00 %	0.70 %
East Laurinburg	48	234	86,256	234	100.00 %	0.27 %
Eastover	43	3,656	82,956	3,656	100.00 %	4.41 %
East Spencer	76	1,567	89,815	1,567	100.00 %	1.74 %
Eden	65	15,421	91,096	15,421	100.00 %	16.93 %
Edenton	1	4,460	84,330	4,460	100.00 %	5.29 %
Elizabeth City	5	18,631	82,953	18,631	100.00 %	22.46 %
Elizabethtown	22	3,296	88,642	3,296	100.00 %	3.72 %
Elkin	90	4,122	82,937	4,122	100.00 %	4.97 %
Elk Park	85	542	90,863	542	100.00 %	0.60 %
Ellenboro	111	723	89,894	723	100.00 %	0.80 %
Ellerbe	52	864	84,383	864	100.00 %	1.02 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Elm City	24	1,218	87,220	1,218	100.00 %	1.40 %
	25	1,218	86,534	0	0.00 %	0.00 %
Elon	64	11,336	85,016	11,336	100.00 %	13.33 %
Emerald Isle	13	3,847	83,307	3,847	100.00 %	4.62 %
Enfield	27	1,865	84,735	1,865	100.00 %	2.20 %
Erwin	53	4,542	86,899	4,542	100.00 %	5.23 %
Eureka	10	214	82,953	214	100.00 %	0.26 %
Everetts	23	150	88,865	150	100.00 %	0.17 %
Fair Bluff	46	709	83,445	709	100.00 %	0.85 %
Fairmont	46	2,191	83,445	2,191	100.00 %	2.63 %
	47	2,191	83,708	0	0.00 %	0.00 %
Fairview	69	3,456	85,179	3,456	100.00 %	4.06 %
Faison	4	784	83,095	784	100.00 %	0.94 %
	22	784	88,642	0	0.00 %	0.00 %
Faith	76	819	89,815	819	100.00 %	0.91 %
Falcon	22	324	88,642	0	0.00 %	0.00 %
	43	324	82,956	324	100.00 %	0.39 %
Falkland	8	47	85,793	47	100.00 %	0.05 %
Fallston	110	627	88,397	627	100.00 %	0.71 %
Farmville	8	4,461	85,793	4,461	100.00 %	5.20 %
Fayetteville	42	208,501	85,537	65,401	31.37 %	76.46 %
	43	208,501	82,956	44,532	21.36 %	53.68 %
	44	208,501	83,297	83,293	39.95 %	100.00 %
	45	208,501	82,938	15,275	7.33 %	18.42 %
Flat Rock	113	3,486	89,058	3,486	100.00 %	3.91 %
Fletcher	117	7,987	91,035	7,987	100.00 %	8.77 %
Fontana Dam	120	13	84,907	13	100.00 %	0.02 %
Forest City	111	7,377	89,894	0	0.00 %	0.00 %
	113	7,377	89,058	7,377	100.00 %	8.28 %
Forest Hills	119	303	90,212	303	100.00 %	0.34 %
Fountain	8	385	85,793	385	100.00 %	0.45 %
Four Oaks	28	2,158	85,389	2,158	100.00 %	2.53 %
Foxfire	52	1,288	84,383	0	0.00 %	0.00 %
	78	1,288	86,365	1,288	100.00 %	1.49 %
Franklin	120	4,175	84,907	4,175	100.00 %	4.92 %
Franklinton	7	2,456	83,510	2,456	100.00 %	2.94 %
Franklinville	78	1,197	86,365	1,197	100.00 %	1.39 %
Fremont	10	1,196	82,953	1,196	100.00 %	1.44 %
Fuquay-Varina	6	34,152	87,332	0	0.00 %	0.00 %
	21	34,152	86,179	30	0.09 %	0.03 %
	36	34,152	90,166	16	0.05 %	0.02 %
	37	34,152	90,867	34,106	99.87 %	37.53 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Gamewell	87	3,702	85,758	3,702	100.00 %	4.32 %
Garland	22	595	88,642	595	100.00 %	0.67 %
Garner	21	31,159	86,179	11,789	37.83 %	13.68 %
	33	31,159	83,049	14	0.04 %	0.02 %
	37	31,159	90,867	0	0.00 %	0.00 %
	38	31,159	88,226	19,356	62.12 %	21.94 %
Garysburg	27	904	84,735	904	100.00 %	1.07 %
Gaston	27	1,008	84,735	1,008	100.00 %	1.19 %
Gastonia	108	80,411	86,263	28,480	35.42 %	33.02 %
	109	80,411	87,762	44,448	55.28 %	50.65 %
	110	80,411	88,397	7,483	9.31 %	8.47 %
Gatesville	5	267	82,953	267	100.00 %	0.32 %
Gibson	48	449	86,256	449	100.00 %	0.52 %
Gibsonville	59	8,920	90,361	4,642	52.04 %	5.14 %
	64	8,920	85,016	4,278	47.96 %	5.03 %
Glen Alpine	86	1,529	87,570	1,529	100.00 %	1.75 %
Godwin	43	128	82,956	128	100.00 %	0.15 %
Goldsboro	4	33,657	83,095	5	0.01 %	0.01 %
	10	33,657	82,953	33,652	99.99 %	40.57 %
Goldston	54	234	83,475	234	100.00 %	0.28 %
Graham	63	17,157	86,399	17,157	100.00 %	19.86 %
Grandfather Village	85	95	90,863	95	100.00 %	0.10 %
Granite Falls	87	4,965	85,758	4,965	100.00 %	5.79 %
Granite Quarry	76	2,984	89,815	2,984	100.00 %	3.32 %
Grantsboro	79	692	83,163	692	100.00 %	0.83 %
Greenevers	4	567	83,095	567	100.00 %	0.68 %
Green Level	63	3,152	86,399	3,152	100.00 %	3.65 %
Greensboro	57	299,035	90,615	83,540	27.94 %	92.19 %
	58	299,035	90,808	84,725	28.33 %	93.30 %
	59	299,035	90,361	13,852	4.63 %	15.33 %
	60	299,035	89,735	8,829	2.95 %	9.84 %
	61	299,035	90,201	90,201	30.16 %	100.00 %
	62	299,035	89,579	17,888	5.98 %	19.97 %
Greenville	8	87,521	85,793	52,881	60.42 %	61.64 %
	9	87,521	84,450	34,640	39.58 %	41.02 %
Grifton	9	2,448	84,450	2,301	94.00 %	2.72 %
	12	2,448	84,745	147	6.00 %	0.17 %
Grimesland	9	386	84,450	386	100.00 %	0.46 %
Grover	111	802	89,894	802	100.00 %	0.89 %
Halifax	27	170	84,735	170	100.00 %	0.20 %
Hamilton	23	306	88,865	306	100.00 %	0.34 %
Hamlet	52	6,025	84,383	6,025	100.00 %	7.14 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Harmony	84	543	86,773	543	100.00 %	0.63 %
Harrells	4	160	83,095	0	0.00 %	0.00 %
	22	160	88,642	160	100.00 %	0.18 %
Harrellsville	5	85	82,953	85	100.00 %	0.10 %
Harrisburg	73	18,967	90,649	18,967	100.00 %	20.92 %
Hassell	23	49	88,865	49	100.00 %	0.06 %
Havelock	3	16,621	85,099	5,986	36.01 %	7.03 %
	13	16,621	83,307	10,635	63.99 %	12.77 %
Haw River	63	2,252	86,399	2,252	100.00 %	2.61 %
Hayesville	120	461	84,907	461	100.00 %	0.54 %
Hemby Bridge	69	1,614	85,179	1,614	100.00 %	1.89 %
Henderson	32	15,060	88,633	15,060	100.00 %	16.99 %
Hendersonville	113	15,137	89,058	623	4.12 %	0.70 %
	117	15,137	91,035	14,514	95.88 %	15.94 %
Hertford	1	1,934	84,330	1,934	100.00 %	2.29 %
Hickory	86	43,490	87,570	79	0.18 %	0.09 %
	87	43,490	85,758	32	0.07 %	0.04 %
	89	43,490	85,577	0	0.00 %	0.00 %
	96	43,490	89,587	43,379	99.74 %	48.42 %
Highlands	119	1,072	90,212	12	1.12 %	0.01 %
	120	1,072	84,907	1,060	98.88 %	1.25 %
High Point	60	114,059	89,735	66,033	57.89 %	73.59 %
	62	114,059	89,579	41,288	36.20 %	46.09 %
	70	114,059	89,118	8	0.01 %	0.01 %
	75	114,059	84,220	84	0.07 %	0.10 %
	80	114,059	84,864	6,646	5.83 %	7.83 %
High Shoals	110	595	88,397	595	100.00 %	0.67 %
Hildebran	86	1,679	87,570	1,679	100.00 %	1.92 %
Hillsborough	50	9,660	85,345	9,660	100.00 %	11.32 %
Hobgood	27	268	84,735	268	100.00 %	0.32 %
Hoffman	52	418	84,383	418	100.00 %	0.50 %
Holden Beach	17	921	89,763	0	0.00 %	0.00 %
	19	921	91,041	921	100.00 %	1.01 %
Holly Ridge	15	4,171	87,578	4,171	100.00 %	4.76 %
Holly Springs	21	41,239	86,179	11,892	28.84 %	13.80 %
	36	41,239	90,166	17,734	43.00 %	19.67 %
	37	41,239	90,867	11,613	28.16 %	12.78 %
Hookerton	12	413	84,745	413	100.00 %	0.49 %
Hope Mills	43	17,808	82,956	64	0.36 %	0.08 %
	45	17,808	82,938	17,744	99.64 %	21.39 %
Hot Springs	118	520	83,282	520	100.00 %	0.62 %
Hudson	87	3,780	85,758	3,780	100.00 %	4.41 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Huntersville	98	61,376	86,827	38,677	63.02 %	44.54 %
	101	61,376	86,426	5,893	9.60 %	6.82 %
	107	61,376	88,237	16,806	27.38 %	19.05 %
Indian Beach	13	223	83,307	223	100.00 %	0.27 %
Indian Trail	55	39,997	87,005	2,376	5.94 %	2.73 %
	68	39,997	88,138	15,036	37.59 %	17.06 %
	69	39,997	85,179	22,585	56.47 %	26.51 %
Jackson	27	430	84,735	430	100.00 %	0.51 %
Jacksonville	14	72,723	86,538	28,456	39.13 %	32.88 %
	15	72,723	87,578	44,267	60.87 %	50.55 %
Jamestown	60	3,668	89,735	3,668	100.00 %	4.09 %
Jamesville	23	424	88,865	424	100.00 %	0.48 %
Jefferson	93	1,622	86,445	1,622	100.00 %	1.88 %
Jonesville	77	2,308	90,628	2,308	100.00 %	2.55 %
Kannapolis	82	53,114	90,771	33,907	63.84 %	37.35 %
	83	53,114	90,742	19,207	36.16 %	21.17 %
Kelford	23	203	88,865	203	100.00 %	0.23 %
Kenansville	4	770	83,095	770	100.00 %	0.93 %
Kenly	24	1,491	87,220	198	13.28 %	0.23 %
	28	1,491	85,389	1,293	86.72 %	1.51 %
Kernersville	62	26,449	89,579	502	1.90 %	0.56 %
	71	26,449	84,874	0	0.00 %	0.00 %
	75	26,449	84,220	25,947	98.10 %	30.81 %
Kill Devil Hills	1	7,656	84,330	7,118	92.97 %	8.44 %
	79	7,656	83,163	538	7.03 %	0.65 %
King	91	7,197	86,210	7,197	100.00 %	8.35 %
Kings Mountain	110	11,142	88,397	1,118	10.03 %	1.26 %
	111	11,142	89,894	10,024	89.97 %	11.15 %
Kingstown	110	656	88,397	656	100.00 %	0.74 %
Kinston	12	19,900	84,745	19,900	100.00 %	23.48 %
Kittrell	32	132	88,633	132	100.00 %	0.15 %
Kitty Hawk	1	3,689	84,330	3,689	100.00 %	4.37 %
Knightdale	38	19,435	88,226	0	0.00 %	0.00 %
	39	19,435	90,164	19,435	100.00 %	21.56 %
Kure Beach	19	2,191	91,041	2,191	100.00 %	2.41 %
La Grange	12	2,595	84,745	2,595	100.00 %	3.06 %
Lake Lure	113	1,365	89,058	1,365	100.00 %	1.53 %
Lake Park	69	3,269	85,179	3,269	100.00 %	3.84 %
Lake Santeetlah	120	38	84,907	38	100.00 %	0.04 %
Lake Waccamaw	46	1,296	83,445	1,296	100.00 %	1.55 %
Landis	83	3,690	90,742	3,690	100.00 %	4.07 %
Lansing	93	126	86,445	126	100.00 %	0.15 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Lasker	27	64	84,735	64	100.00 %	0.08 %
Lattimore	111	406	89,894	406	100.00 %	0.45 %
Laurel Park	113	2,250	89,058	0	0.00 %	0.00 %
	117	2,250	91,035	2,250	100.00 %	2.47 %
Laurinburg	48	14,978	86,256	14,978	100.00 %	17.36 %
Lawndale	110	570	88,397	570	100.00 %	0.64 %
Leggett	23	37	88,865	37	100.00 %	0.04 %
Leland	17	22,908	89,763	22,908	100.00 %	25.52 %
Lenoir	87	18,352	85,758	18,352	100.00 %	21.40 %
Lewiston Woodville	23	426	88,865	426	100.00 %	0.48 %
Lewisville	74	13,381	84,857	13,381	100.00 %	15.77 %
Lexington	80	19,632	84,864	0	0.00 %	0.00 %
	81	19,632	84,066	19,632	100.00 %	23.35 %
Liberty	54	2,655	83,475	2,655	100.00 %	3.18 %
Lilesville	55	395	87,005	395	100.00 %	0.45 %
Lillington	6	4,735	87,332	882	18.63 %	1.01 %
	53	4,735	86,899	3,853	81.37 %	4.43 %
Lincolnton	97	11,091	86,810	11,091	100.00 %	12.78 %
Linden	43	136	82,956	136	100.00 %	0.16 %
Littleton	27	559	84,735	559	100.00 %	0.66 %
Locust	67	4,537	88,255	3,996	88.08 %	4.53 %
	73	4,537	90,649	541	11.92 %	0.60 %
Long View	86	5,088	87,570	735	14.45 %	0.84 %
	96	5,088	89,587	4,353	85.55 %	4.86 %
Louisburg	7	3,064	83,510	3,064	100.00 %	3.67 %
Love Valley	84	154	86,773	154	100.00 %	0.18 %
Lowell	108	3,654	86,263	3,654	100.00 %	4.24 %
	109	3,654	87,762	0	0.00 %	0.00 %
Lucama	24	1,036	87,220	1,036	100.00 %	1.19 %
Lumber Bridge	47	82	83,708	82	100.00 %	0.10 %
Lumberton	46	19,025	83,445	350	1.84 %	0.42 %
	47	19,025	83,708	18,675	98.16 %	22.31 %
McAdenville	108	890	86,263	890	100.00 %	1.03 %
Macclesfield	23	413	88,865	413	100.00 %	0.46 %
McDonald	46	94	83,445	94	100.00 %	0.11 %
McFarlan	55	94	87,005	94	100.00 %	0.11 %
Macon	27	110	84,735	110	100.00 %	0.13 %
Madison	65	2,129	91,096	2,129	100.00 %	2.34 %
Maggie Valley	118	1,687	83,282	1,687	100.00 %	2.03 %
Magnolia	4	831	83,095	831	100.00 %	1.00 %
Maiden	89	3,736	85,577	3,736	100.00 %	4.37 %
	97	3,736	86,810	0	0.00 %	0.00 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Manteo	79	1,600	83,163	1,600	100.00 %	1.92 %
Marietta	46	111	83,445	111	100.00 %	0.13 %
Marion	85	7,717	90,863	7,717	100.00 %	8.49 %
Marshall	118	777	83,282	777	100.00 %	0.93 %
Mars Hill	118	2,007	83,282	2,007	100.00 %	2.41 %
Marshville	55	2,522	87,005	2,522	100.00 %	2.90 %
Marvin	68	6,358	88,138	6,358	100.00 %	7.21 %
Matthews	103	29,435	87,132	29,435	100.00 %	33.78 %
Maxton	46	2,110	83,445	1,902	90.14 %	2.28 %
	48	2,110	86,256	208	9.86 %	0.24 %
Mayodan	65	2,418	91,096	2,418	100.00 %	2.65 %
Maysville	12	818	84,745	818	100.00 %	0.97 %
Mebane	50	17,797	85,345	3,171	17.82 %	3.72 %
	63	17,797	86,399	14,626	82.18 %	16.93 %
Mesic	79	144	83,163	144	100.00 %	0.17 %
Micro	28	458	85,389	458	100.00 %	0.54 %
Middleburg	32	101	88,633	101	100.00 %	0.11 %
Middlesex	24	912	87,220	912	100.00 %	1.05 %
Midland	73	4,684	90,649	4,684	100.00 %	5.17 %
	103	4,684	87,132	0	0.00 %	0.00 %
Midway	80	4,742	84,864	3,469	73.15 %	4.09 %
	81	4,742	84,066	1,273	26.85 %	1.51 %
Mills River	117	7,078	91,035	7,078	100.00 %	7.78 %
Milton	50	155	85,345	155	100.00 %	0.18 %
Mineral Springs	55	3,159	87,005	2,293	72.59 %	2.64 %
	68	3,159	88,138	866	27.41 %	0.98 %
Minnesott Beach	79	530	83,163	530	100.00 %	0.64 %
Mint Hill	69	26,450	85,179	6	0.02 %	0.01 %
	99	26,450	87,647	0	0.00 %	0.00 %
	103	26,450	87,132	26,444	99.98 %	30.35 %
Misenheimer	67	650	88,255	650	100.00 %	0.74 %
Mocksville	77	5,900	90,628	5,900	100.00 %	6.51 %
Momeyer	25	277	86,534	277	100.00 %	0.32 %
Monroe	55	34,562	87,005	12,650	36.60 %	14.54 %
	69	34,562	85,179	21,912	63.40 %	25.72 %
Montreat	115	901	90,262	901	100.00 %	1.00 %
Mooresboro	111	293	89,894	293	100.00 %	0.33 %
Mooresville	84	50,193	86,773	205	0.41 %	0.24 %
	95	50,193	85,366	49,988	99.59 %	58.56 %
Morehead City	13	9,556	83,307	9,556	100.00 %	11.47 %
Morganton	86	17,474	87,570	17,474	100.00 %	19.95 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Morrisville	11	29,630	86,298	0	0.00 %	0.00 %
	31	29,630	90,760	207	0.70 %	0.23 %
	41	29,630	89,887	14,239	48.06 %	15.84 %
	49	29,630	86,157	15,184	51.25 %	17.62 %
Morven	55	329	87,005	329	100.00 %	0.38 %
Mount Airy	90	10,676	82,937	10,676	100.00 %	12.87 %
Mount Gilead	67	1,171	88,255	1,171	100.00 %	1.33 %
Mount Holly	108	17,703	86,263	17,703	100.00 %	20.52 %
Mount Olive	4	4,198	83,095	4,198	100.00 %	5.05 %
Mount Pleasant	73	1,671	90,649	1,671	100.00 %	1.84 %
Murfreesboro	5	2,619	82,953	2,619	100.00 %	3.16 %
Murphy	120	1,608	84,907	1,608	100.00 %	1.89 %
Nags Head	79	3,168	83,163	3,168	100.00 %	3.81 %
Nashville	25	5,632	86,534	5,632	100.00 %	6.51 %
Navassa	17	1,367	89,763	1,367	100.00 %	1.52 %
New Bern	3	31,291	85,099	31,291	100.00 %	36.77 %
Newland	85	715	90,863	715	100.00 %	0.79 %
New London	67	607	88,255	607	100.00 %	0.69 %
Newport	13	4,364	83,307	4,364	100.00 %	5.24 %
Newton	89	13,148	85,577	13,148	100.00 %	15.36 %
	96	13,148	89,587	0	0.00 %	0.00 %
Newton Grove	22	585	88,642	585	100.00 %	0.66 %
Norlina	27	920	84,735	920	100.00 %	1.09 %
Norman	52	100	84,383	100	100.00 %	0.12 %
North Topsail Beach	15	1,005	87,578	1,005	100.00 %	1.15 %
Northwest	17	703	89,763	703	100.00 %	0.78 %
North Wilkesboro	94	4,382	90,835	4,382	100.00 %	4.82 %
Norwood	67	2,367	88,255	2,367	100.00 %	2.68 %
Oakboro	67	2,128	88,255	2,128	100.00 %	2.41 %
Oak City	23	266	88,865	266	100.00 %	0.30 %
Oak Island	19	8,396	91,041	8,396	100.00 %	9.22 %
Oak Ridge	62	7,474	89,579	7,474	100.00 %	8.34 %
Ocean Isle Beach	17	867	89,763	867	100.00 %	0.97 %
Old Fort	85	811	90,863	811	100.00 %	0.89 %
Oriental	79	880	83,163	880	100.00 %	1.06 %
Orrum	46	59	83,445	59	100.00 %	0.07 %
Ossipee	64	536	85,016	536	100.00 %	0.63 %
Oxford	32	8,628	88,633	8,628	100.00 %	9.73 %
Pantego	79	164	83,163	164	100.00 %	0.20 %
Parkton	47	504	83,708	504	100.00 %	0.60 %
Parmele	23	243	88,865	243	100.00 %	0.27 %
Patterson Springs	111	571	89,894	571	100.00 %	0.64 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Peachland	55	390	87,005	390	100.00 %	0.45 %
Peletier	13	769	83,307	769	100.00 %	0.92 %
Pembroke	47	2,823	83,708	2,823	100.00 %	3.37 %
Pikeville	10	712	82,953	712	100.00 %	0.86 %
Pilot Mountain	90	1,440	82,937	1,440	100.00 %	1.74 %
Pinebluff	52	1,473	84,383	1,473	100.00 %	1.75 %
Pinehurst	52	17,581	84,383	8	0.05 %	0.01 %
	78	17,581	86,365	17,573	99.95 %	20.35 %
Pine Knoll Shores	13	1,388	83,307	1,388	100.00 %	1.67 %
Pine Level	28	2,046	85,389	2,046	100.00 %	2.40 %
Pinetops	23	1,200	88,865	1,200	100.00 %	1.35 %
Pineville	105	10,602	85,822	10,602	100.00 %	12.35 %
	112	10,602	82,806	0	0.00 %	0.00 %
Pink Hill	12	451	84,745	451	100.00 %	0.53 %
Pittsboro	54	4,537	83,475	4,537	100.00 %	5.44 %
Pleasant Garden	59	5,000	90,361	5,000	100.00 %	5.53 %
Plymouth	1	3,320	84,330	3,320	100.00 %	3.94 %
Polkton	55	2,250	87,005	2,250	100.00 %	2.59 %
Polkville	110	516	88,397	516	100.00 %	0.58 %
Pollocksville	12	268	84,745	268	100.00 %	0.32 %
Powellsville	23	189	88,865	189	100.00 %	0.21 %
Princeton	28	1,315	85,389	1,315	100.00 %	1.54 %
Princeville	23	1,254	88,865	1,254	100.00 %	1.41 %
Proctorville	46	121	83,445	121	100.00 %	0.15 %
Raeford	48	4,559	86,256	4,559	100.00 %	5.29 %
Raleigh	2	467,665	90,793	1,326	0.28 %	1.46 %
	11	467,665	86,298	40,792	8.72 %	47.27 %
	21	467,665	86,179	13	0.00 %	0.02 %
	31	467,665	90,760	233	0.05 %	0.26 %
	33	467,665	83,049	82,480	17.64 %	99.31 %
	34	467,665	83,679	83,503	17.86 %	99.79 %
	35	467,665	88,374	6,171	1.32 %	6.98 %
	38	467,665	88,226	56,840	12.15 %	64.43 %
	39	467,665	90,164	13,011	2.78 %	14.43 %
	40	467,665	83,175	57,345	12.26 %	68.94 %
	49	467,665	86,157	47,783	10.22 %	55.46 %
	66	467,665	83,189	78,168	16.71 %	93.96 %
Ramseur	78	1,774	86,365	1,774	100.00 %	2.05 %
Randleman	70	4,595	89,118	4,595	100.00 %	5.16 %
Ranlo	108	4,511	86,263	4,500	99.76 %	5.22 %
	110	4,511	88,397	11	0.24 %	0.01 %
Raynham	46	60	83,445	60	100.00 %	0.07 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Red Cross	67	762	88,255	762	100.00 %	0.86 %
Red Oak	25	3,342	86,534	3,342	100.00 %	3.86 %
Red Springs	47	3,087	83,708	3,087	100.00 %	3.69 %
	48	3,087	86,256	0	0.00 %	0.00 %
Reidsville	65	14,583	91,096	14,583	100.00 %	16.01 %
Rennert	47	275	83,708	275	100.00 %	0.33 %
Rhodhiss	86	997	87,570	639	64.09 %	0.73 %
	87	997	85,758	358	35.91 %	0.42 %
Richfield	67	582	88,255	582	100.00 %	0.66 %
Richlands	16	2,287	90,663	2,287	100.00 %	2.52 %
Rich Square	27	894	84,735	894	100.00 %	1.06 %
River Bend	3	2,902	85,099	2,902	100.00 %	3.41 %
Roanoke Rapids	27	15,229	84,735	15,229	100.00 %	17.97 %
Robbins	78	1,168	86,365	1,168	100.00 %	1.35 %
Robbinsville	120	597	84,907	597	100.00 %	0.70 %
Robersonville	23	1,269	88,865	1,269	100.00 %	1.43 %
Rockingham	52	9,243	84,383	9,243	100.00 %	10.95 %
Rockwell	76	2,302	89,815	2,302	100.00 %	2.56 %
Rocky Mount	23	54,341	88,865	15,414	28.37 %	17.35 %
	25	54,341	86,534	38,927	71.63 %	44.98 %
Rolesville	35	9,475	88,374	9,467	99.92 %	10.71 %
	39	9,475	90,164	8	0.08 %	0.01 %
Ronda	90	438	82,937	438	100.00 %	0.53 %
Roper	1	485	84,330	485	100.00 %	0.58 %
Roseboro	22	1,163	88,642	1,163	100.00 %	1.31 %
Rose Hill	4	1,371	83,095	1,371	100.00 %	1.65 %
Rosman	119	701	90,212	701	100.00 %	0.78 %
Rowland	46	885	83,445	885	100.00 %	1.06 %
Roxboro	2	8,134	90,793	8,134	100.00 %	8.96 %
Roxobel	23	187	88,865	187	100.00 %	0.21 %
Rural Hall	91	3,351	86,210	3,351	100.00 %	3.89 %
Ruth	113	347	89,058	347	100.00 %	0.39 %
Rutherford College	86	1,226	87,570	1,226	100.00 %	1.40 %
	87	1,226	85,758	0	0.00 %	0.00 %
Rutherfordton	113	3,640	89,058	3,640	100.00 %	4.09 %
St. Helena	16	417	90,663	417	100.00 %	0.46 %
St. James	19	6,529	91,041	6,529	100.00 %	7.17 %
St. Pauls	47	2,045	83,708	2,045	100.00 %	2.44 %
Salemburg	22	457	88,642	457	100.00 %	0.52 %
Salisbury	76	35,540	89,815	35,540	100.00 %	39.57 %
Saluda	113	631	89,058	631	100.00 %	0.71 %
Sandy Creek	17	248	89,763	248	100.00 %	0.28 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Sandyfield	46	430	83,445	430	100.00 %	0.52 %
Sanford	51	30,261	83,073	30,261	100.00 %	36.43 %
Saratoga	24	353	87,220	353	100.00 %	0.40 %
Sawmills	87	5,020	85,758	5,020	100.00 %	5.85 %
Scotland Neck	27	1,640	84,735	1,640	100.00 %	1.94 %
Seaboard	27	542	84,735	542	100.00 %	0.64 %
Seagrove	78	235	86,365	235	100.00 %	0.27 %
Sedalia	59	676	90,361	676	100.00 %	0.75 %
Selma	28	6,317	85,389	6,317	100.00 %	7.40 %
Seven Devils	85	313	90,863	38	12.14 %	0.04 %
	93	313	86,445	275	87.86 %	0.32 %
Seven Springs	4	55	83,095	55	100.00 %	0.07 %
Severn	27	191	84,735	191	100.00 %	0.23 %
Shallotte	17	4,185	89,763	4,185	100.00 %	4.66 %
Sharpsburg	23	1,697	88,865	215	12.67 %	0.24 %
	24	1,697	87,220	421	24.81 %	0.48 %
	25	1,697	86,534	1,061	62.52 %	1.23 %
Shelby	110	21,918	88,397	4,409	20.12 %	4.99 %
	111	21,918	89,894	17,509	79.88 %	19.48 %
Siler City	54	7,702	83,475	7,702	100.00 %	9.23 %
Simpson	9	390	84,450	390	100.00 %	0.46 %
Sims	24	275	87,220	275	100.00 %	0.32 %
Smithfield	28	11,292	85,389	11,292	100.00 %	13.22 %
Snow Hill	12	1,481	84,745	1,481	100.00 %	1.75 %
Southern Pines	52	15,545	84,383	15,545	100.00 %	18.42 %
	78	15,545	86,365	0	0.00 %	0.00 %
Southern Shores	1	3,090	84,330	3,090	100.00 %	3.66 %
Southport	19	3,971	91,041	3,971	100.00 %	4.36 %
Sparta	93	1,834	86,445	1,834	100.00 %	2.12 %
Speed	23	63	88,865	63	100.00 %	0.07 %
Spencer	76	3,308	89,815	3,308	100.00 %	3.68 %
Spencer Mountain	108	0	86,263	0	0.00 %	0.00 %
Spindale	113	4,225	89,058	4,225	100.00 %	4.74 %
Spring Hope	25	1,309	86,534	1,309	100.00 %	1.51 %
Spring Lake	42	11,660	85,537	11,660	100.00 %	13.63 %
Spruce Pine	85	2,194	90,863	2,194	100.00 %	2.41 %
Staley	54	397	83,475	397	100.00 %	0.48 %
Stallings	68	16,112	88,138	0	0.00 %	0.00 %
	69	16,112	85,179	15,728	97.62 %	18.46 %
	103	16,112	87,132	384	2.38 %	0.44 %
Stanfield	67	1,585	88,255	1,585	100.00 %	1.80 %
Stanley	108	3,963	86,263	3,963	100.00 %	4.59 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Stantonsburg	24	762	87,220	762	100.00 %	0.87 %
Star	67	806	88,255	806	100.00 %	0.91 %
Statesville	84	28,419	86,773	28,415	99.99 %	32.75 %
	89	28,419	85,577	4	0.01 %	0.00 %
Stedman	43	1,277	82,956	1,277	100.00 %	1.54 %
Stem	32	960	88,633	960	100.00 %	1.08 %
Stokesdale	62	5,924	89,579	5,924	100.00 %	6.61 %
Stoneville	65	1,308	91,096	1,308	100.00 %	1.44 %
Stonewall	79	214	83,163	214	100.00 %	0.26 %
Stovall	32	324	88,633	324	100.00 %	0.37 %
Sugar Mountain	85	371	90,863	371	100.00 %	0.41 %
Summerfield	57	10,951	90,615	746	6.81 %	0.82 %
	59	10,951	90,361	2,509	22.91 %	2.78 %
	62	10,951	89,579	7,696	70.28 %	8.59 %
Sunset Beach	17	4,175	89,763	4,175	100.00 %	4.65 %
Surf City	15	3,867	87,578	334	8.64 %	0.38 %
	16	3,867	90,663	3,533	91.36 %	3.90 %
Swansboro	14	3,744	86,538	3,744	100.00 %	4.33 %
Swepsonville	63	2,445	86,399	2,445	100.00 %	2.83 %
Sylva	119	2,578	90,212	2,578	100.00 %	2.86 %
Tabor City	46	3,781	83,445	3,781	100.00 %	4.53 %
Tarboro	23	10,721	88,865	10,721	100.00 %	12.06 %
Tar Heel	22	90	88,642	90	100.00 %	0.10 %
Taylorsville	94	2,320	90,835	2,320	100.00 %	2.55 %
Taylortown	52	634	84,383	4	0.63 %	0.00 %
	78	634	86,365	630	99.37 %	0.73 %
Teachey	4	448	83,095	448	100.00 %	0.54 %
Thomasville	70	27,183	89,118	521	1.92 %	0.58 %
	80	27,183	84,864	26,662	98.08 %	31.42 %
Tobaccoville	74	2,578	84,857	824	31.96 %	0.97 %
	91	2,578	86,210	1,754	68.04 %	2.03 %
Topsail Beach	16	461	90,663	461	100.00 %	0.51 %
Trenton	12	238	84,745	238	100.00 %	0.28 %
Trent Woods	3	4,074	85,099	4,074	100.00 %	4.79 %
Trinity	70	7,006	89,118	7,006	100.00 %	7.86 %
Troutman	84	3,698	86,773	885	23.93 %	1.02 %
	89	3,698	85,577	2,813	76.07 %	3.29 %
Troy	67	2,850	88,255	2,850	100.00 %	3.23 %
Tryon	113	1,562	89,058	1,562	100.00 %	1.75 %
Turkey	22	213	88,642	213	100.00 %	0.24 %
Unionville	69	6,643	85,179	6,643	100.00 %	7.80 %
Valdese	86	4,689	87,570	4,689	100.00 %	5.35 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Vanceboro	3	869	85,099	869	100.00 %	1.02 %
Vandemere	79	246	83,163	246	100.00 %	0.30 %
Varnamtown	19	525	91,041	525	100.00 %	0.58 %
Vass	51	952	83,073	952	100.00 %	1.15 %
Waco	110	310	88,397	310	100.00 %	0.35 %
Wade	43	638	82,956	638	100.00 %	0.77 %
Wadesboro	55	5,008	87,005	5,008	100.00 %	5.76 %
Wagram	48	615	86,256	615	100.00 %	0.71 %
Wake Forest	7	47,601	83,510	1,504	3.16 %	1.80 %
	35	47,601	88,374	46,097	96.84 %	52.16 %
	66	47,601	83,189	0	0.00 %	0.00 %
Walkertown	71	5,692	84,874	3,176	55.80 %	3.74 %
	75	5,692	84,220	2,516	44.20 %	2.99 %
Wallace	4	3,413	83,095	3,413	100.00 %	4.11 %
	16	3,413	90,663	0	0.00 %	0.00 %
Wallburg	80	3,051	84,864	3,051	100.00 %	3.60 %
Walnut Cove	91	1,586	86,210	1,586	100.00 %	1.84 %
Walnut Creek	4	1,084	83,095	1,084	100.00 %	1.30 %
Walstonburg	12	193	84,745	193	100.00 %	0.23 %
Warrenton	27	851	84,735	851	100.00 %	1.00 %
Warsaw	4	2,733	83,095	2,733	100.00 %	3.29 %
Washington	79	9,875	83,163	9,875	100.00 %	11.87 %
Washington Park	79	392	83,163	392	100.00 %	0.47 %
Watha	16	181	90,663	181	100.00 %	0.20 %
Waxhaw	55	20,534	87,005	0	0.00 %	0.00 %
	68	20,534	88,138	20,534	100.00 %	23.30 %
Waynesville	118	10,140	83,282	10,140	100.00 %	12.18 %
Weaverville	114	4,567	89,685	4,567	100.00 %	5.09 %
Webster	119	372	90,212	372	100.00 %	0.41 %
Weddington	68	13,181	88,138	13,172	99.93 %	14.94 %
	69	13,181	85,179	4	0.03 %	0.00 %
	103	13,181	87,132	5	0.04 %	0.01 %
Weldon	27	1,444	84,735	1,444	100.00 %	1.70 %
Wendell	39	9,793	90,164	9,793	100.00 %	10.86 %
Wentworth	65	2,662	91,096	2,662	100.00 %	2.92 %
Wesley Chapel	55	8,681	87,005	3,868	44.56 %	4.45 %
	68	8,681	88,138	4,813	55.44 %	5.46 %
West Jefferson	93	1,279	86,445	1,279	100.00 %	1.48 %
Whispering Pines	52	4,987	84,383	4,987	100.00 %	5.91 %
Whitakers	23	627	88,865	290	46.25 %	0.33 %
	25	627	86,534	337	53.75 %	0.39 %
White Lake	22	843	88,642	843	100.00 %	0.95 %

Municipality - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Whiteville	46	4,766	83,445	4,766	100.00 %	5.71 %
Whitsett	59	584	90,361	584	100.00 %	0.65 %
Wilkesboro	94	3,687	90,835	3,687	100.00 %	4.06 %
Williamston	23	5,248	88,865	5,248	100.00 %	5.91 %
Wilmington	18	115,451	91,245	48,680	42.17 %	53.35 %
	19	115,451	91,041	8,207	7.11 %	9.01 %
	20	115,451	90,346	58,564	50.73 %	64.82 %
Wilson	24	47,851	87,220	47,851	100.00 %	54.86 %
Wilson's Mills	26	2,534	89,947	0	0.00 %	0.00 %
	28	2,534	85,389	2,534	100.00 %	2.97 %
Windsor	23	3,582	88,865	3,582	100.00 %	4.03 %
Winfall	1	555	84,330	555	100.00 %	0.66 %
Wingate	55	4,055	87,005	4,055	100.00 %	4.66 %
Winston-Salem	71	249,545	84,874	77,631	31.11 %	91.47 %
	72	249,545	86,949	86,867	34.81 %	99.91 %
	74	249,545	84,857	32,409	12.99 %	38.19 %
	75	249,545	84,220	22,818	9.14 %	27.09 %
	91	249,545	86,210	29,820	11.95 %	34.59 %
Winterville	8	10,462	85,793	44	0.42 %	0.05 %
	9	10,462	84,450	10,418	99.58 %	12.34 %
Winton	5	629	82,953	629	100.00 %	0.76 %
Woodfin	114	7,936	89,685	7,648	96.37 %	8.53 %
	116	7,936	89,505	288	3.63 %	0.32 %
Woodland	27	557	84,735	557	100.00 %	0.66 %
Wrightsville Beach	20	2,473	90,346	2,473	100.00 %	2.74 %
Yadkinville	77	2,995	90,628	2,995	100.00 %	3.30 %
Yanceyville	50	1,937	85,345	1,937	100.00 %	2.27 %
Youngsville	7	2,016	83,510	2,016	100.00 %	2.41 %
Zebulon	26	6,903	89,947	0	0.00 %	0.00 %
	39	6,903	90,164	6,903	100.00 %	7.66 %
			Total:	**6,017,605**		

Number of split municipalities: 112
Display: all municipalities

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Aberdeen	52	8,516	84,383	8,516	100.00 %	10.09 %
	78	8,516	86,365	0	0.00 %	0.00 %
Ahoskie	5	4,891	82,953	4,891	100.00 %	5.90 %
Alamance	64	988	85,016	988	100.00 %	1.16 %
Albemarle	67	16,432	88,255	16,432	100.00 %	18.62 %
Alliance	79	733	83,163	733	100.00 %	0.88 %
Andrews	120	1,667	84,907	1,667	100.00 %	1.96 %
Angier (Harnett)	6	4,709	87,332	4,709	100.00 %	5.39 %
Angier (Wake)	37	556	90,867	556	100.00 %	0.61 %
Ansonville	55	440	87,005	440	100.00 %	0.51 %
Apex	11	58,780	86,298	0	0.00 %	0.00 %
	21	58,780	86,179	556	0.95 %	0.65 %
	36	58,780	90,166	57,843	98.41 %	64.15 %
	41	58,780	89,887	381	0.65 %	0.42 %
Arapahoe	79	416	83,163	416	100.00 %	0.50 %
Archdale (Guilford)	60	380	89,735	380	100.00 %	0.42 %
Archdale (Randolph)	70	11,527	89,118	11,527	100.00 %	12.93 %
Archer Lodge	26	4,797	89,947	4,797	100.00 %	5.33 %
Asheboro	70	27,156	89,118	25,890	95.34 %	29.05 %
	78	27,156	86,365	1,266	4.66 %	1.47 %
Asheville	114	94,589	89,685	52,596	55.60 %	58.65 %
	115	94,589	90,262	29,236	30.91 %	32.39 %
	116	94,589	89,505	12,757	13.49 %	14.25 %
Askewville	23	184	88,865	184	100.00 %	0.21 %
Atkinson	16	296	90,663	296	100.00 %	0.33 %
Atlantic Beach	13	1,364	83,307	1,364	100.00 %	1.64 %
Aulander	23	763	88,865	763	100.00 %	0.86 %
Aurora	79	455	83,163	455	100.00 %	0.55 %
Autryville	22	167	88,642	167	100.00 %	0.19 %
Ayden	9	4,977	84,450	4,977	100.00 %	5.89 %
Badin	67	2,024	88,255	2,024	100.00 %	2.29 %
Bailey	24	568	87,220	568	100.00 %	0.65 %
Bakersville	85	450	90,863	450	100.00 %	0.50 %
Bald Head Island	19	268	91,041	268	100.00 %	0.29 %
Banner Elk	85	1,049	90,863	1,049	100.00 %	1.15 %
Bath	79	245	83,163	245	100.00 %	0.29 %
Bayboro	79	1,161	83,163	1,161	100.00 %	1.40 %
Bear Grass	23	89	88,865	89	100.00 %	0.10 %
Beaufort	13	4,464	83,307	4,464	100.00 %	5.36 %
Beech Mountain (Avery)	85	62	90,863	62	100.00 %	0.07 %
Beech Mountain (Watauga)	93	613	86,445	613	100.00 %	0.71 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Belhaven	79	1,410	83,163	1,410	100.00 %	1.70 %
Belmont	108	15,010	86,263	1,868	12.45 %	2.17 %
	109	15,010	87,762	13,142	87.55 %	14.97 %
Belville	17	2,406	89,763	2,406	100.00 %	2.68 %
Belwood	110	857	88,397	857	100.00 %	0.97 %
Benson (Harnett)	53	0	86,899	0	0.00 %	0.00 %
Benson (Johnston)	28	3,967	85,389	3,967	100.00 %	4.65 %
Bermuda Run	77	3,120	90,628	3,120	100.00 %	3.44 %
Bessemer City	110	5,428	88,397	5,428	100.00 %	6.14 %
Bethania	74	344	84,857	0	0.00 %	0.00 %
	91	344	86,210	344	100.00 %	0.40 %
Bethel	8	1,373	85,793	1,373	100.00 %	1.60 %
Beulaville	4	1,116	83,095	1,116	100.00 %	1.34 %
Biltmore Forest	116	1,409	89,505	1,409	100.00 %	1.57 %
Biscoe	67	1,848	88,255	1,848	100.00 %	2.09 %
Black Creek	24	692	87,220	692	100.00 %	0.79 %
Black Mountain	115	8,426	90,262	8,426	100.00 %	9.34 %
Bladenboro	22	1,648	88,642	1,648	100.00 %	1.86 %
Blowing Rock (Caldwell)	87	91	85,758	91	100.00 %	0.11 %
Blowing Rock (Watauga)	87	1,285	85,758	5	0.39 %	0.01 %
	93	1,285	86,445	1,280	99.61 %	1.48 %
Boardman	46	166	83,445	166	100.00 %	0.20 %
Bogue	13	695	83,307	695	100.00 %	0.83 %
Boiling Spring Lakes	19	5,943	91,041	5,943	100.00 %	6.53 %
Boiling Springs	111	4,615	89,894	4,615	100.00 %	5.13 %
Bolivia	19	149	91,041	149	100.00 %	0.16 %
Bolton	46	519	83,445	519	100.00 %	0.62 %
Boone	87	19,092	85,758	595	3.12 %	0.69 %
	93	19,092	86,445	18,497	96.88 %	21.40 %
Boonville	77	1,185	90,628	1,185	100.00 %	1.31 %
Bostic	111	355	89,894	355	100.00 %	0.39 %
Brevard	119	7,744	90,212	7,744	100.00 %	8.58 %
Bridgeton	3	349	85,099	349	100.00 %	0.41 %
Broadway (Harnett)	6	0	87,332	0	0.00 %	0.00 %
Broadway (Lee)	51	1,267	83,073	1,267	100.00 %	1.53 %
Brookford	96	442	89,587	442	100.00 %	0.49 %
Brunswick	46	973	83,445	973	100.00 %	1.17 %
Bryson City	119	1,558	90,212	1,558	100.00 %	1.73 %
Bunn	7	327	83,510	327	100.00 %	0.39 %
Burgaw	16	3,088	90,663	3,088	100.00 %	3.41 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Burlington (Alamance)	63	55,481	86,399	25,917	46.71 %	30.00 %
	64	55,481	85,016	29,564	53.29 %	34.77 %
Burlington (Guilford)	59	1,822	90,361	1,822	100.00 %	2.02 %
Burnsville	85	1,614	90,863	1,614	100.00 %	1.78 %
Butner	32	8,397	88,633	8,397	100.00 %	9.47 %
Cajah's Mountain	87	2,722	85,758	2,722	100.00 %	3.17 %
Calabash	17	2,011	89,763	2,011	100.00 %	2.24 %
Calypso	4	327	83,095	327	100.00 %	0.39 %
Cameron	51	244	83,073	244	100.00 %	0.29 %
Candor (Montgomery)	67	813	88,255	813	100.00 %	0.92 %
Candor (Moore)	78	0	86,365	0	0.00 %	0.00 %
Canton	118	4,422	83,282	4,422	100.00 %	5.31 %
Cape Carteret	13	2,224	83,307	2,224	100.00 %	2.67 %
Carolina Beach	19	6,564	91,041	6,564	100.00 %	7.21 %
Carolina Shores	17	4,588	89,763	4,588	100.00 %	5.11 %
Carrboro	50	21,295	85,345	174	0.82 %	0.20 %
	56	21,295	86,087	21,121	99.18 %	24.53 %
Carthage	51	2,775	83,073	2,747	98.99 %	3.31 %
	52	2,775	84,383	28	1.01 %	0.03 %
Cary (Chatham)	54	3,709	83,475	3,709	100.00 %	4.44 %
Cary (Wake)	11	171,012	86,298	43,537	25.46 %	50.45 %
	21	171,012	86,179	30,622	17.91 %	35.53 %
	36	171,012	90,166	0	0.00 %	0.00 %
	37	171,012	90,867	2,012	1.18 %	2.21 %
	41	171,012	89,887	74,074	43.32 %	82.41 %
	49	171,012	86,157	20,767	12.14 %	24.10 %
Casar	110	305	88,397	305	100.00 %	0.35 %
Castalia	25	264	86,534	264	100.00 %	0.31 %
Caswell Beach	19	395	91,041	395	100.00 %	0.43 %
Catawba	89	702	85,577	702	100.00 %	0.82 %
Cedar Point	13	1,764	83,307	1,764	100.00 %	2.12 %
Cedar Rock	87	301	85,758	301	100.00 %	0.35 %
Cerro Gordo	46	131	83,445	131	100.00 %	0.16 %
Chadbourn	46	1,574	83,445	1,574	100.00 %	1.89 %
Chapel Hill (Durham)	29	2,906	91,212	2,906	100.00 %	3.19 %
Chapel Hill (Orange)	56	59,054	86,087	59,054	100.00 %	68.60 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Charlotte	88	874,579	82,834	82,834	9.47 %	100.00 %
	92	874,579	85,031	63,762	7.29 %	74.99 %
	99	874,579	87,647	79,113	9.05 %	90.26 %
	100	874,579	87,197	87,197	9.97 %	100.00 %
	101	874,579	86,426	64,526	7.38 %	74.66 %
	102	874,579	86,179	86,179	9.85 %	100.00 %
	103	874,579	87,132	23,590	2.70 %	27.07 %
	104	874,579	86,520	86,520	9.89 %	100.00 %
	105	874,579	85,822	71,156	8.14 %	82.91 %
	106	874,579	82,824	79,717	9.11 %	96.25 %
	107	874,579	88,237	67,298	7.69 %	76.27 %
	112	874,579	82,806	82,687	9.45 %	99.86 %
Cherryville	110	6,078	88,397	6,078	100.00 %	6.88 %
Chimney Rock Village	113	140	89,058	140	100.00 %	0.16 %
China Grove	83	4,434	90,742	4,434	100.00 %	4.89 %
Chocowinity	79	722	83,163	722	100.00 %	0.87 %
Claremont	89	1,692	85,577	1,692	100.00 %	1.98 %
Clarkton	22	614	88,642	614	100.00 %	0.69 %
Clayton (Johnston)	26	26,307	89,947	26,307	100.00 %	29.25 %
Clayton (Wake)	38	0	88,226	0	0.00 %	0.00 %
	39	0	90,164	0	0.00 %	0.00 %
Clemmons	74	21,163	84,857	21,163	100.00 %	24.94 %
Cleveland	77	846	90,628	846	100.00 %	0.93 %
Clinton	22	8,383	88,642	8,383	100.00 %	9.46 %
Clyde	118	1,368	83,282	1,368	100.00 %	1.64 %
Coats	53	2,155	86,899	2,155	100.00 %	2.48 %
Cofield	5	267	82,953	267	100.00 %	0.32 %
Colerain	23	217	88,865	217	100.00 %	0.24 %
Columbia	1	610	84,330	610	100.00 %	0.72 %
Columbus	113	1,060	89,058	1,060	100.00 %	1.19 %
Como	5	67	82,953	67	100.00 %	0.08 %
Concord	73	105,240	90,649	32,447	30.83 %	35.79 %
	82	105,240	90,771	48,723	46.30 %	53.68 %
	83	105,240	90,742	24,070	22.87 %	26.53 %
Conetoe	23	198	88,865	198	100.00 %	0.22 %
Connelly Springs	86	1,529	87,570	1,529	100.00 %	1.75 %
Conover	89	8,421	85,577	424	5.04 %	0.50 %
	96	8,421	89,587	7,997	94.96 %	8.93 %
Conway	27	752	84,735	752	100.00 %	0.89 %
Cooleemee	77	940	90,628	940	100.00 %	1.04 %
Cornelius	98	31,412	86,827	31,412	100.00 %	36.18 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Cove City	3	378	85,099	378	100.00 %	0.44 %
Cramerton	108	5,296	86,263	96	1.81 %	0.11 %
	109	5,296	87,762	5,200	98.19 %	5.93 %
Creedmoor	7	4,866	83,510	2,065	42.44 %	2.47 %
	32	4,866	88,633	2,801	57.56 %	3.16 %
Creswell	1	207	84,330	207	100.00 %	0.25 %
Crossnore	85	143	90,863	143	100.00 %	0.16 %
Dallas	110	5,927	88,397	5,927	100.00 %	6.70 %
Danbury	91	189	86,210	189	100.00 %	0.22 %
Davidson (Iredell)	95	378	85,366	378	100.00 %	0.44 %
Davidson (Mecklenburg)	98	14,728	86,827	14,728	100.00 %	16.96 %
Dellview	110	6	88,397	6	100.00 %	0.01 %
Denton	80	1,494	84,864	1,494	100.00 %	1.76 %
Dillsboro	119	213	90,212	213	100.00 %	0.24 %
Dobbins Heights	52	687	84,383	687	100.00 %	0.81 %
Dobson	90	1,462	82,937	1,462	100.00 %	1.76 %
Dortches	25	1,082	86,534	1,082	100.00 %	1.25 %
Dover	3	349	85,099	349	100.00 %	0.41 %
Drexel	86	1,760	87,570	1,760	100.00 %	2.01 %
Dublin	22	267	88,642	267	100.00 %	0.30 %
Duck	1	742	84,330	742	100.00 %	0.88 %
Dunn	53	8,446	86,899	8,446	100.00 %	9.72 %
Durham (Durham)	2	283,093	90,793	25,167	8.89 %	27.72 %
	29	283,093	91,212	87,035	30.74 %	95.42 %
	30	283,093	91,165	89,671	31.68 %	98.36 %
	31	283,093	90,760	81,220	28.69 %	89.49 %
Durham (Orange)	50	144	85,345	144	100.00 %	0.17 %
Durham (Wake)	40	269	83,175	269	100.00 %	0.32 %
	49	269	86,157	0	0.00 %	0.00 %
Earl	111	198	89,894	198	100.00 %	0.22 %
East Arcadia	22	418	88,642	418	100.00 %	0.47 %
East Bend	77	634	90,628	634	100.00 %	0.70 %
East Laurinburg	48	234	86,256	234	100.00 %	0.27 %
East Spencer	76	1,567	89,815	1,567	100.00 %	1.74 %
Eastover	43	3,656	82,956	3,656	100.00 %	4.41 %
Eden	65	15,421	91,096	15,421	100.00 %	16.93 %
Edenton	1	4,460	84,330	4,460	100.00 %	5.29 %
Elizabeth City (Camden)	5	38	82,953	38	100.00 %	0.05 %
Elizabeth City (Pasquotank)	5	18,593	82,953	18,593	100.00 %	22.41 %
Elizabethtown	22	3,296	88,642	3,296	100.00 %	3.72 %
Elk Park	85	542	90,863	542	100.00 %	0.60 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Elkin (Surry)	90	4,049	82,937	4,049	100.00 %	4.88 %
Elkin (Wilkes)	90	73	82,937	73	100.00 %	0.09 %
Ellenboro	111	723	89,894	723	100.00 %	0.80 %
Ellerbe	52	864	84,383	864	100.00 %	1.02 %
Elm City (Nash)	25	0	86,534	0	0.00 %	0.00 %
Elm City (Wilson)	24	1,218	87,220	1,218	100.00 %	1.40 %
Elon	64	11,336	85,016	11,336	100.00 %	13.33 %
Emerald Isle	13	3,847	83,307	3,847	100.00 %	4.62 %
Enfield	27	1,865	84,735	1,865	100.00 %	2.20 %
Erwin	53	4,542	86,899	4,542	100.00 %	5.23 %
Eureka	10	214	82,953	214	100.00 %	0.26 %
Everetts	23	150	88,865	150	100.00 %	0.17 %
Fair Bluff	46	709	83,445	709	100.00 %	0.85 %
Fairmont	46	2,191	83,445	2,191	100.00 %	2.63 %
	47	2,191	83,708	0	0.00 %	0.00 %
Fairview	69	3,456	85,179	3,456	100.00 %	4.06 %
Faison (Duplin)	4	784	83,095	784	100.00 %	0.94 %
Faison (Sampson)	22	0	88,642	0	0.00 %	0.00 %
Faith	76	819	89,815	819	100.00 %	0.91 %
Falcon (Cumberland)	43	324	82,956	324	100.00 %	0.39 %
Falcon (Sampson)	22	0	88,642	0	0.00 %	0.00 %
Falkland	8	47	85,793	47	100.00 %	0.05 %
Fallston	110	627	88,397	627	100.00 %	0.71 %
Farmville	8	4,461	85,793	4,461	100.00 %	5.20 %
Fayetteville	42	208,501	85,537	65,401	31.37 %	76.46 %
	43	208,501	82,956	44,532	21.36 %	53.68 %
	44	208,501	83,297	83,293	39.95 %	100.00 %
	45	208,501	82,938	15,275	7.33 %	18.42 %
Flat Rock	113	3,486	89,058	3,486	100.00 %	3.91 %
Fletcher	117	7,987	91,035	7,987	100.00 %	8.77 %
Fontana Dam	120	13	84,907	13	100.00 %	0.02 %
Forest City	111	7,377	89,894	0	0.00 %	0.00 %
	113	7,377	89,058	7,377	100.00 %	8.28 %
Forest Hills	119	303	90,212	303	100.00 %	0.34 %
Fountain	8	385	85,793	385	100.00 %	0.45 %
Four Oaks	28	2,158	85,389	2,158	100.00 %	2.53 %
Foxfire	52	1,288	84,383	0	0.00 %	0.00 %
	78	1,288	86,365	1,288	100.00 %	1.49 %
Franklin	120	4,175	84,907	4,175	100.00 %	4.92 %
Franklinton	7	2,456	83,510	2,456	100.00 %	2.94 %
Franklinville	78	1,197	86,365	1,197	100.00 %	1.39 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Fremont	10	1,196	82,953	1,196	100.00 %	1.44 %
Fuquay-Varina (Harnett)	6	0	87,332	0	0.00 %	0.00 %
Fuquay-Varina (Wake)	21	34,152	86,179	30	0.09 %	0.03 %
	36	34,152	90,166	16	0.05 %	0.02 %
	37	34,152	90,867	34,106	99.87 %	37.53 %
Gamewell	87	3,702	85,758	3,702	100.00 %	4.32 %
Garland	22	595	88,642	595	100.00 %	0.67 %
Garner	21	31,159	86,179	11,789	37.83 %	13.68 %
	33	31,159	83,049	14	0.04 %	0.02 %
	37	31,159	90,867	0	0.00 %	0.00 %
	38	31,159	88,226	19,356	62.12 %	21.94 %
Garysburg	27	904	84,735	904	100.00 %	1.07 %
Gaston	27	1,008	84,735	1,008	100.00 %	1.19 %
Gastonia	108	80,411	86,263	28,480	35.42 %	33.02 %
	109	80,411	87,762	44,448	55.28 %	50.65 %
	110	80,411	88,397	7,483	9.31 %	8.47 %
Gatesville	5	267	82,953	267	100.00 %	0.32 %
Gibson	48	449	86,256	449	100.00 %	0.52 %
Gibsonville (Alamance)	64	4,278	85,016	4,278	100.00 %	5.03 %
Gibsonville (Guilford)	59	4,642	90,361	4,642	100.00 %	5.14 %
Glen Alpine	86	1,529	87,570	1,529	100.00 %	1.75 %
Godwin	43	128	82,956	128	100.00 %	0.15 %
Goldsboro	4	33,657	83,095	5	0.01 %	0.01 %
	10	33,657	82,953	33,652	99.99 %	40.57 %
Goldston	54	234	83,475	234	100.00 %	0.28 %
Graham	63	17,157	86,399	17,157	100.00 %	19.86 %
Grandfather Village	85	95	90,863	95	100.00 %	0.10 %
Granite Falls	87	4,965	85,758	4,965	100.00 %	5.79 %
Granite Quarry	76	2,984	89,815	2,984	100.00 %	3.32 %
Grantsboro	79	692	83,163	692	100.00 %	0.83 %
Green Level	63	3,152	86,399	3,152	100.00 %	3.65 %
Greenevers	4	567	83,095	567	100.00 %	0.68 %
Greensboro	57	299,035	90,615	83,540	27.94 %	92.19 %
	58	299,035	90,808	84,725	28.33 %	93.30 %
	59	299,035	90,361	13,852	4.63 %	15.33 %
	60	299,035	89,735	8,829	2.95 %	9.84 %
	61	299,035	90,201	90,201	30.16 %	100.00 %
	62	299,035	89,579	17,888	5.98 %	19.97 %
Greenville	8	87,521	85,793	52,881	60.42 %	61.64 %
	9	87,521	84,450	34,640	39.58 %	41.02 %
Grifton (Lenoir)	12	147	84,745	147	100.00 %	0.17 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Grifton (Pitt)	9	2,301	84,450	2,301	100.00 %	2.72 %
Grimesland	9	386	84,450	386	100.00 %	0.46 %
Grover	111	802	89,894	802	100.00 %	0.89 %
Halifax	27	170	84,735	170	100.00 %	0.20 %
Hamilton	23	306	88,865	306	100.00 %	0.34 %
Hamlet	52	6,025	84,383	6,025	100.00 %	7.14 %
Harmony	84	543	86,773	543	100.00 %	0.63 %
Harrells (Duplin)	4	0	83,095	0	0.00 %	0.00 %
Harrells (Sampson)	22	160	88,642	160	100.00 %	0.18 %
Harrellsville	5	85	82,953	85	100.00 %	0.10 %
Harrisburg	73	18,967	90,649	18,967	100.00 %	20.92 %
Hassell	23	49	88,865	49	100.00 %	0.06 %
Havelock	3	16,621	85,099	5,986	36.01 %	7.03 %
	13	16,621	83,307	10,635	63.99 %	12.77 %
Haw River	63	2,252	86,399	2,252	100.00 %	2.61 %
Hayesville	120	461	84,907	461	100.00 %	0.54 %
Hemby Bridge	69	1,614	85,179	1,614	100.00 %	1.89 %
Henderson	32	15,060	88,633	15,060	100.00 %	16.99 %
Hendersonville	113	15,137	89,058	623	4.12 %	0.70 %
	117	15,137	91,035	14,514	95.88 %	15.94 %
Hertford	1	1,934	84,330	1,934	100.00 %	2.29 %
Hickory (Burke)	86	79	87,570	79	100.00 %	0.09 %
Hickory (Caldwell)	87	32	85,758	32	100.00 %	0.04 %
Hickory (Catawba)	89	43,379	85,577	0	0.00 %	0.00 %
	96	43,379	89,587	43,379	100.00 %	48.42 %
High Point (Davidson)	80	6,646	84,864	6,646	100.00 %	7.83 %
High Point (Forsyth)	75	84	84,220	84	100.00 %	0.10 %
High Point (Guilford)	60	107,321	89,735	66,033	61.53 %	73.59 %
	62	107,321	89,579	41,288	38.47 %	46.09 %
High Point (Randolph)	70	8	89,118	8	100.00 %	0.01 %
High Shoals	110	595	88,397	595	100.00 %	0.67 %
Highlands (Jackson)	119	12	90,212	12	100.00 %	0.01 %
Highlands (Macon)	120	1,060	84,907	1,060	100.00 %	1.25 %
Hildebran	86	1,679	87,570	1,679	100.00 %	1.92 %
Hillsborough	50	9,660	85,345	9,660	100.00 %	11.32 %
Hobgood	27	268	84,735	268	100.00 %	0.32 %
Hoffman	52	418	84,383	418	100.00 %	0.50 %
Holden Beach	17	921	89,763	0	0.00 %	0.00 %
	19	921	91,041	921	100.00 %	1.01 %
Holly Ridge	15	4,171	87,578	4,171	100.00 %	4.76 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Holly Springs	21	41,239	86,179	11,892	28.84 %	13.80 %
	36	41,239	90,166	17,734	43.00 %	19.67 %
	37	41,239	90,867	11,613	28.16 %	12.78 %
Hookerton	12	413	84,745	413	100.00 %	0.49 %
Hope Mills	43	17,808	82,956	64	0.36 %	0.08 %
	45	17,808	82,938	17,744	99.64 %	21.39 %
Hot Springs	118	520	83,282	520	100.00 %	0.62 %
Hudson	87	3,780	85,758	3,780	100.00 %	4.41 %
Huntersville	98	61,376	86,827	38,677	63.02 %	44.54 %
	101	61,376	86,426	5,893	9.60 %	6.82 %
	107	61,376	88,237	16,806	27.38 %	19.05 %
Indian Beach	13	223	83,307	223	100.00 %	0.27 %
Indian Trail	55	39,997	87,005	2,376	5.94 %	2.73 %
	68	39,997	88,138	15,036	37.59 %	17.06 %
	69	39,997	85,179	22,585	56.47 %	26.51 %
Jackson	27	430	84,735	430	100.00 %	0.51 %
Jacksonville	14	72,723	86,538	28,456	39.13 %	32.88 %
	15	72,723	87,578	44,267	60.87 %	50.55 %
Jamestown	60	3,668	89,735	3,668	100.00 %	4.09 %
Jamesville	23	424	88,865	424	100.00 %	0.48 %
Jefferson	93	1,622	86,445	1,622	100.00 %	1.88 %
Jonesville	77	2,308	90,628	2,308	100.00 %	2.55 %
Kannapolis (Cabarrus)	82	42,846	90,771	33,907	79.14 %	37.35 %
	83	42,846	90,742	8,939	20.86 %	9.85 %
Kannapolis (Rowan)	83	10,268	90,742	10,268	100.00 %	11.32 %
Kelford	23	203	88,865	203	100.00 %	0.23 %
Kenansville	4	770	83,095	770	100.00 %	0.93 %
Kenly (Johnston)	28	1,293	85,389	1,293	100.00 %	1.51 %
Kenly (Wilson)	24	198	87,220	198	100.00 %	0.23 %
Kernersville (Forsyth)	71	25,947	84,874	0	0.00 %	0.00 %
	75	25,947	84,220	25,947	100.00 %	30.81 %
Kernersville (Guilford)	62	502	89,579	502	100.00 %	0.56 %
Kill Devil Hills	1	7,656	84,330	7,118	92.97 %	8.44 %
	79	7,656	83,163	538	7.03 %	0.65 %
King (Forsyth)	91	591	86,210	591	100.00 %	0.69 %
King (Stokes)	91	6,606	86,210	6,606	100.00 %	7.66 %
Kings Mountain (Cleveland)	110	10,032	88,397	8	0.08 %	0.01 %
	111	10,032	89,894	10,024	99.92 %	11.15 %
Kings Mountain (Gaston)	110	1,110	88,397	1,110	100.00 %	1.26 %
Kingstown	110	656	88,397	656	100.00 %	0.74 %
Kinston	12	19,900	84,745	19,900	100.00 %	23.48 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.
[G20-MbCD] - Generated 11/4/2021

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Kittrell	32	132	88,633	132	100.00 %	0.15 %
Kitty Hawk	1	3,689	84,330	3,689	100.00 %	4.37 %
Knightdale	38	19,435	88,226	0	0.00 %	0.00 %
	39	19,435	90,164	19,435	100.00 %	21.56 %
Kure Beach	19	2,191	91,041	2,191	100.00 %	2.41 %
La Grange	12	2,595	84,745	2,595	100.00 %	3.06 %
Lake Lure	113	1,365	89,058	1,365	100.00 %	1.53 %
Lake Park	69	3,269	85,179	3,269	100.00 %	3.84 %
Lake Santeetlah	120	38	84,907	38	100.00 %	0.04 %
Lake Waccamaw	46	1,296	83,445	1,296	100.00 %	1.55 %
Landis	83	3,690	90,742	3,690	100.00 %	4.07 %
Lansing	93	126	86,445	126	100.00 %	0.15 %
Lasker	27	64	84,735	64	100.00 %	0.08 %
Lattimore	111	406	89,894	406	100.00 %	0.45 %
Laurel Park	113	2,250	89,058	0	0.00 %	0.00 %
	117	2,250	91,035	2,250	100.00 %	2.47 %
Laurinburg	48	14,978	86,256	14,978	100.00 %	17.36 %
Lawndale	110	570	88,397	570	100.00 %	0.64 %
Leggett	23	37	88,865	37	100.00 %	0.04 %
Leland	17	22,908	89,763	22,908	100.00 %	25.52 %
Lenoir	87	18,352	85,758	18,352	100.00 %	21.40 %
Lewiston Woodville	23	426	88,865	426	100.00 %	0.48 %
Lewisville	74	13,381	84,857	13,381	100.00 %	15.77 %
Lexington	80	19,632	84,864	0	0.00 %	0.00 %
	81	19,632	84,066	19,632	100.00 %	23.35 %
Liberty	54	2,655	83,475	2,655	100.00 %	3.18 %
Lilesville	55	395	87,005	395	100.00 %	0.45 %
Lillington	6	4,735	87,332	882	18.63 %	1.01 %
	53	4,735	86,899	3,853	81.37 %	4.43 %
Lincolnton	97	11,091	86,810	11,091	100.00 %	12.78 %
Linden	43	136	82,956	136	100.00 %	0.16 %
Littleton	27	559	84,735	559	100.00 %	0.66 %
Locust (Cabarrus)	73	541	90,649	541	100.00 %	0.60 %
Locust (Stanly)	67	3,996	88,255	3,996	100.00 %	4.53 %
Long View (Burke)	86	735	87,570	735	100.00 %	0.84 %
Long View (Catawba)	96	4,353	89,587	4,353	100.00 %	4.86 %
Louisburg	7	3,064	83,510	3,064	100.00 %	3.67 %
Love Valley	84	154	86,773	154	100.00 %	0.18 %
Lowell	108	3,654	86,263	3,654	100.00 %	4.24 %
	109	3,654	87,762	0	0.00 %	0.00 %
Lucama	24	1,036	87,220	1,036	100.00 %	1.19 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Lumber Bridge	47	82	83,708	82	100.00 %	0.10 %
Lumberton	46	19,025	83,445	350	1.84 %	0.42 %
	47	19,025	83,708	18,675	98.16 %	22.31 %
Macclesfield	23	413	88,865	413	100.00 %	0.46 %
Macon	27	110	84,735	110	100.00 %	0.13 %
Madison	65	2,129	91,096	2,129	100.00 %	2.34 %
Maggie Valley	118	1,687	83,282	1,687	100.00 %	2.03 %
Magnolia	4	831	83,095	831	100.00 %	1.00 %
Maiden (Catawba)	89	3,736	85,577	3,736	100.00 %	4.37 %
Maiden (Lincoln)	97	0	86,810	0	0.00 %	0.00 %
Manteo	79	1,600	83,163	1,600	100.00 %	1.92 %
Marietta	46	111	83,445	111	100.00 %	0.13 %
Marion	85	7,717	90,863	7,717	100.00 %	8.49 %
Mars Hill	118	2,007	83,282	2,007	100.00 %	2.41 %
Marshall	118	777	83,282	777	100.00 %	0.93 %
Marshville	55	2,522	87,005	2,522	100.00 %	2.90 %
Marvin	68	6,358	88,138	6,358	100.00 %	7.21 %
Matthews	103	29,435	87,132	29,435	100.00 %	33.78 %
Maxton (Robeson)	46	1,902	83,445	1,902	100.00 %	2.28 %
Maxton (Scotland)	48	208	86,256	208	100.00 %	0.24 %
Mayodan	65	2,418	91,096	2,418	100.00 %	2.65 %
Maysville	12	818	84,745	818	100.00 %	0.97 %
McAdenville	108	890	86,263	890	100.00 %	1.03 %
McDonald	46	94	83,445	94	100.00 %	0.11 %
McFarlan	55	94	87,005	94	100.00 %	0.11 %
Mebane (Alamance)	63	14,626	86,399	14,626	100.00 %	16.93 %
Mebane (Orange)	50	3,171	85,345	3,171	100.00 %	3.72 %
Mesic	79	144	83,163	144	100.00 %	0.17 %
Micro	28	458	85,389	458	100.00 %	0.54 %
Middleburg	32	101	88,633	101	100.00 %	0.11 %
Middlesex	24	912	87,220	912	100.00 %	1.05 %
Midland (Cabarrus)	73	4,684	90,649	4,684	100.00 %	5.17 %
Midland (Mecklenburg)	103	0	87,132	0	0.00 %	0.00 %
Midway	80	4,742	84,864	3,469	73.15 %	4.09 %
	81	4,742	84,066	1,273	26.85 %	1.51 %
Mills River	117	7,078	91,035	7,078	100.00 %	7.78 %
Milton	50	155	85,345	155	100.00 %	0.18 %
Mineral Springs	55	3,159	87,005	2,293	72.59 %	2.64 %
	68	3,159	88,138	866	27.41 %	0.98 %
Minnesott Beach	79	530	83,163	530	100.00 %	0.64 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Mint Hill (Mecklenburg)	99	26,444	87,647	0	0.00 %	0.00 %
	103	26,444	87,132	26,444	100.00 %	30.35 %
Mint Hill (Union)	69	6	85,179	6	100.00 %	0.01 %
Misenheimer	67	650	88,255	650	100.00 %	0.74 %
Mocksville	77	5,900	90,628	5,900	100.00 %	6.51 %
Momeyer	25	277	86,534	277	100.00 %	0.32 %
Monroe	55	34,562	87,005	12,650	36.60 %	14.54 %
	69	34,562	85,179	21,912	63.40 %	25.72 %
Montreat	115	901	90,262	901	100.00 %	1.00 %
Mooresboro	111	293	89,894	293	100.00 %	0.33 %
Mooresville	84	50,193	86,773	205	0.41 %	0.24 %
	95	50,193	85,366	49,988	99.59 %	58.56 %
Morehead City	13	9,556	83,307	9,556	100.00 %	11.47 %
Morganton	86	17,474	87,570	17,474	100.00 %	19.95 %
Morrisville (Durham)	31	207	90,760	207	100.00 %	0.23 %
Morrisville (Wake)	11	29,423	86,298	0	0.00 %	0.00 %
	41	29,423	89,887	14,239	48.39 %	15.84 %
	49	29,423	86,157	15,184	51.61 %	17.62 %
Morven	55	329	87,005	329	100.00 %	0.38 %
Mount Airy	90	10,676	82,937	10,676	100.00 %	12.87 %
Mount Gilead	67	1,171	88,255	1,171	100.00 %	1.33 %
Mount Holly	108	17,703	86,263	17,703	100.00 %	20.52 %
Mount Olive (Duplin)	4	5	83,095	5	100.00 %	0.01 %
Mount Olive (Wayne)	4	4,193	83,095	4,193	100.00 %	5.05 %
Mount Pleasant	73	1,671	90,649	1,671	100.00 %	1.84 %
Murfreesboro	5	2,619	82,953	2,619	100.00 %	3.16 %
Murphy	120	1,608	84,907	1,608	100.00 %	1.89 %
Nags Head	79	3,168	83,163	3,168	100.00 %	3.81 %
Nashville	25	5,632	86,534	5,632	100.00 %	6.51 %
Navassa	17	1,367	89,763	1,367	100.00 %	1.52 %
New Bern	3	31,291	85,099	31,291	100.00 %	36.77 %
New London	67	607	88,255	607	100.00 %	0.69 %
Newland	85	715	90,863	715	100.00 %	0.79 %
Newport	13	4,364	83,307	4,364	100.00 %	5.24 %
Newton	89	13,148	85,577	13,148	100.00 %	15.36 %
	96	13,148	89,587	0	0.00 %	0.00 %
Newton Grove	22	585	88,642	585	100.00 %	0.66 %
Norlina	27	920	84,735	920	100.00 %	1.09 %
Norman	52	100	84,383	100	100.00 %	0.12 %
North Topsail Beach	15	1,005	87,578	1,005	100.00 %	1.15 %
North Wilkesboro	94	4,382	90,835	4,382	100.00 %	4.82 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Northwest	17	703	89,763	703	100.00 %	0.78 %
Norwood	67	2,367	88,255	2,367	100.00 %	2.68 %
Oak City	23	266	88,865	266	100.00 %	0.30 %
Oak Island	19	8,396	91,041	8,396	100.00 %	9.22 %
Oak Ridge	62	7,474	89,579	7,474	100.00 %	8.34 %
Oakboro	67	2,128	88,255	2,128	100.00 %	2.41 %
Ocean Isle Beach	17	867	89,763	867	100.00 %	0.97 %
Old Fort	85	811	90,863	811	100.00 %	0.89 %
Oriental	79	880	83,163	880	100.00 %	1.06 %
Orrum	46	59	83,445	59	100.00 %	0.07 %
Ossipee	64	536	85,016	536	100.00 %	0.63 %
Oxford	32	8,628	88,633	8,628	100.00 %	9.73 %
Pantego	79	164	83,163	164	100.00 %	0.20 %
Parkton	47	504	83,708	504	100.00 %	0.60 %
Parmele	23	243	88,865	243	100.00 %	0.27 %
Patterson Springs	111	571	89,894	571	100.00 %	0.64 %
Peachland	55	390	87,005	390	100.00 %	0.45 %
Peletier	13	769	83,307	769	100.00 %	0.92 %
Pembroke	47	2,823	83,708	2,823	100.00 %	3.37 %
Pikeville	10	712	82,953	712	100.00 %	0.86 %
Pilot Mountain	90	1,440	82,937	1,440	100.00 %	1.74 %
Pine Knoll Shores	13	1,388	83,307	1,388	100.00 %	1.67 %
Pine Level	28	2,046	85,389	2,046	100.00 %	2.40 %
Pinebluff	52	1,473	84,383	1,473	100.00 %	1.75 %
Pinehurst	52	17,581	84,383	8	0.05 %	0.01 %
	78	17,581	86,365	17,573	99.95 %	20.35 %
Pinetops	23	1,200	88,865	1,200	100.00 %	1.35 %
Pineville	105	10,602	85,822	10,602	100.00 %	12.35 %
	112	10,602	82,806	0	0.00 %	0.00 %
Pink Hill	12	451	84,745	451	100.00 %	0.53 %
Pittsboro	54	4,537	83,475	4,537	100.00 %	5.44 %
Pleasant Garden	59	5,000	90,361	5,000	100.00 %	5.53 %
Plymouth	1	3,320	84,330	3,320	100.00 %	3.94 %
Polkton	55	2,250	87,005	2,250	100.00 %	2.59 %
Polkville	110	516	88,397	516	100.00 %	0.58 %
Pollocksville	12	268	84,745	268	100.00 %	0.32 %
Powellsville	23	189	88,865	189	100.00 %	0.21 %
Princeton	28	1,315	85,389	1,315	100.00 %	1.54 %
Princeville	23	1,254	88,865	1,254	100.00 %	1.41 %
Proctorville	46	121	83,445	121	100.00 %	0.15 %
Raeford	48	4,559	86,256	4,559	100.00 %	5.29 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Raleigh (Durham)	2	1,559	90,793	1,326	85.05 %	1.46 %
	31	1,559	90,760	233	14.95 %	0.26 %
Raleigh (Wake)	11	466,106	86,298	40,792	8.75 %	47.27 %
	21	466,106	86,179	13	0.00 %	0.02 %
	33	466,106	83,049	82,480	17.70 %	99.31 %
	34	466,106	83,679	83,503	17.92 %	99.79 %
	35	466,106	88,374	6,171	1.32 %	6.98 %
	38	466,106	88,226	56,840	12.19 %	64.43 %
	39	466,106	90,164	13,011	2.79 %	14.43 %
	40	466,106	83,175	57,345	12.30 %	68.94 %
	49	466,106	86,157	47,783	10.25 %	55.46 %
	66	466,106	83,189	78,168	16.77 %	93.96 %
Ramseur	78	1,774	86,365	1,774	100.00 %	2.05 %
Randleman	70	4,595	89,118	4,595	100.00 %	5.16 %
Ranlo	108	4,511	86,263	4,500	99.76 %	5.22 %
	110	4,511	88,397	11	0.24 %	0.01 %
Raynham	46	60	83,445	60	100.00 %	0.07 %
Red Cross	67	762	88,255	762	100.00 %	0.86 %
Red Oak	25	3,342	86,534	3,342	100.00 %	3.86 %
Red Springs (Hoke)	48	0	86,256	0	0.00 %	0.00 %
Red Springs (Robeson)	47	3,087	83,708	3,087	100.00 %	3.69 %
Reidsville	65	14,583	91,096	14,583	100.00 %	16.01 %
Rennert	47	275	83,708	275	100.00 %	0.33 %
Rhodhiss (Burke)	86	639	87,570	639	100.00 %	0.73 %
Rhodhiss (Caldwell)	87	358	85,758	358	100.00 %	0.42 %
Rich Square	27	894	84,735	894	100.00 %	1.06 %
Richfield	67	582	88,255	582	100.00 %	0.66 %
Richlands	16	2,287	90,663	2,287	100.00 %	2.52 %
River Bend	3	2,902	85,099	2,902	100.00 %	3.41 %
Roanoke Rapids	27	15,229	84,735	15,229	100.00 %	17.97 %
Robbins	78	1,168	86,365	1,168	100.00 %	1.35 %
Robbinsville	120	597	84,907	597	100.00 %	0.70 %
Robersonville	23	1,269	88,865	1,269	100.00 %	1.43 %
Rockingham	52	9,243	84,383	9,243	100.00 %	10.95 %
Rockwell	76	2,302	89,815	2,302	100.00 %	2.56 %
Rocky Mount (Edgecombe)	23	15,414	88,865	15,414	100.00 %	17.35 %
Rocky Mount (Nash)	25	38,927	86,534	38,927	100.00 %	44.98 %
Rolesville	35	9,475	88,374	9,467	99.92 %	10.71 %
	39	9,475	90,164	8	0.08 %	0.01 %
Ronda	90	438	82,937	438	100.00 %	0.53 %
Roper	1	485	84,330	485	100.00 %	0.58 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Rose Hill	4	1,371	83,095	1,371	100.00 %	1.65 %
Roseboro	22	1,163	88,642	1,163	100.00 %	1.31 %
Rosman	119	701	90,212	701	100.00 %	0.78 %
Rowland	46	885	83,445	885	100.00 %	1.06 %
Roxboro	2	8,134	90,793	8,134	100.00 %	8.96 %
Roxobel	23	187	88,865	187	100.00 %	0.21 %
Rural Hall	91	3,351	86,210	3,351	100.00 %	3.89 %
Ruth	113	347	89,058	347	100.00 %	0.39 %
Rutherford College (Burke)	86	1,226	87,570	1,226	100.00 %	1.40 %
Rutherford College (Caldwell)	87	0	85,758	0	0.00 %	0.00 %
Rutherfordton	113	3,640	89,058	3,640	100.00 %	4.09 %
Salemburg	22	457	88,642	457	100.00 %	0.52 %
Salisbury	76	35,540	89,815	35,540	100.00 %	39.57 %
Saluda (Henderson)	113	11	89,058	11	100.00 %	0.01 %
Saluda (Polk)	113	620	89,058	620	100.00 %	0.70 %
Sandy Creek	17	248	89,763	248	100.00 %	0.28 %
Sandyfield	46	430	83,445	430	100.00 %	0.52 %
Sanford	51	30,261	83,073	30,261	100.00 %	36.43 %
Saratoga	24	353	87,220	353	100.00 %	0.40 %
Sawmills	87	5,020	85,758	5,020	100.00 %	5.85 %
Scotland Neck	27	1,640	84,735	1,640	100.00 %	1.94 %
Seaboard	27	542	84,735	542	100.00 %	0.64 %
Seagrove	78	235	86,365	235	100.00 %	0.27 %
Sedalia	59	676	90,361	676	100.00 %	0.75 %
Selma	28	6,317	85,389	6,317	100.00 %	7.40 %
Seven Devils (Avery)	85	38	90,863	38	100.00 %	0.04 %
Seven Devils (Watauga)	93	275	86,445	275	100.00 %	0.32 %
Seven Springs	4	55	83,095	55	100.00 %	0.07 %
Severn	27	191	84,735	191	100.00 %	0.23 %
Shallotte	17	4,185	89,763	4,185	100.00 %	4.66 %
Sharpsburg (Edgecombe)	23	215	88,865	215	100.00 %	0.24 %
Sharpsburg (Nash)	25	1,061	86,534	1,061	100.00 %	1.23 %
Sharpsburg (Wilson)	24	421	87,220	421	100.00 %	0.48 %
Shelby	110	21,918	88,397	4,409	20.12 %	4.99 %
	111	21,918	89,894	17,509	79.88 %	19.48 %
Siler City	54	7,702	83,475	7,702	100.00 %	9.23 %
Simpson	9	390	84,450	390	100.00 %	0.46 %
Sims	24	275	87,220	275	100.00 %	0.32 %
Smithfield	28	11,292	85,389	11,292	100.00 %	13.22 %
Snow Hill	12	1,481	84,745	1,481	100.00 %	1.75 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Southern Pines	52	15,545	84,383	15,545	100.00 %	18.42 %
	78	15,545	86,365	0	0.00 %	0.00 %
Southern Shores	1	3,090	84,330	3,090	100.00 %	3.66 %
Southport	19	3,971	91,041	3,971	100.00 %	4.36 %
Sparta	93	1,834	86,445	1,834	100.00 %	2.12 %
Speed	23	63	88,865	63	100.00 %	0.07 %
Spencer	76	3,308	89,815	3,308	100.00 %	3.68 %
Spencer Mountain	108	0	86,263	0	0.00 %	0.00 %
Spindale	113	4,225	89,058	4,225	100.00 %	4.74 %
Spring Hope	25	1,309	86,534	1,309	100.00 %	1.51 %
Spring Lake	42	11,660	85,537	11,660	100.00 %	13.63 %
Spruce Pine	85	2,194	90,863	2,194	100.00 %	2.41 %
St. Helena	16	417	90,663	417	100.00 %	0.46 %
St. James	19	6,529	91,041	6,529	100.00 %	7.17 %
St. Pauls	47	2,045	83,708	2,045	100.00 %	2.44 %
Staley	54	397	83,475	397	100.00 %	0.48 %
Stallings (Mecklenburg)	103	384	87,132	384	100.00 %	0.44 %
Stallings (Union)	68	15,728	88,138	0	0.00 %	0.00 %
	69	15,728	85,179	15,728	100.00 %	18.46 %
Stanfield	67	1,585	88,255	1,585	100.00 %	1.80 %
Stanley	108	3,963	86,263	3,963	100.00 %	4.59 %
Stantonsburg	24	762	87,220	762	100.00 %	0.87 %
Star	67	806	88,255	806	100.00 %	0.91 %
Statesville	84	28,419	86,773	28,415	99.99 %	32.75 %
	89	28,419	85,577	4	0.01 %	0.00 %
Stedman	43	1,277	82,956	1,277	100.00 %	1.54 %
Stem	32	960	88,633	960	100.00 %	1.08 %
Stokesdale	62	5,924	89,579	5,924	100.00 %	6.61 %
Stoneville	65	1,308	91,096	1,308	100.00 %	1.44 %
Stonewall	79	214	83,163	214	100.00 %	0.26 %
Stovall	32	324	88,633	324	100.00 %	0.37 %
Sugar Mountain	85	371	90,863	371	100.00 %	0.41 %
Summerfield	57	10,951	90,615	746	6.81 %	0.82 %
	59	10,951	90,361	2,509	22.91 %	2.78 %
	62	10,951	89,579	7,696	70.28 %	8.59 %
Sunset Beach	17	4,175	89,763	4,175	100.00 %	4.65 %
Surf City (Onslow)	15	334	87,578	334	100.00 %	0.38 %
Surf City (Pender)	16	3,533	90,663	3,533	100.00 %	3.90 %
Swansboro	14	3,744	86,538	3,744	100.00 %	4.33 %
Swepsonville	63	2,445	86,399	2,445	100.00 %	2.83 %
Sylva	119	2,578	90,212	2,578	100.00 %	2.86 %

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Municipalities derive from the 2020 Census Redistricting Data (P.L. 94-171) Shapefiles. Population figures are based on the associated Summary File.
Note that for the purposes of this report, portions of municipalities in different counties are treated separately.

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Tabor City	46	3,781	83,445	3,781	100.00 %	4.53 %
Tar Heel	22	90	88,642	90	100.00 %	0.10 %
Tarboro	23	10,721	88,865	10,721	100.00 %	12.06 %
Taylorsville	94	2,320	90,835	2,320	100.00 %	2.55 %
Taylortown	52	634	84,383	4	0.63 %	0.00 %
	78	634	86,365	630	99.37 %	0.73 %
Teachey	4	448	83,095	448	100.00 %	0.54 %
Thomasville (Davidson)	80	26,662	84,864	26,662	100.00 %	31.42 %
Thomasville (Randolph)	70	521	89,118	521	100.00 %	0.58 %
Tobaccoville (Forsyth)	74	2,578	84,857	824	31.96 %	0.97 %
	91	2,578	86,210	1,754	68.04 %	2.03 %
Tobaccoville (Stokes)	91	0	86,210	0	0.00 %	0.00 %
Topsail Beach	16	461	90,663	461	100.00 %	0.51 %
Trent Woods	3	4,074	85,099	4,074	100.00 %	4.79 %
Trenton	12	238	84,745	238	100.00 %	0.28 %
Trinity	70	7,006	89,118	7,006	100.00 %	7.86 %
Troutman	84	3,698	86,773	885	23.93 %	1.02 %
	89	3,698	85,577	2,813	76.07 %	3.29 %
Troy	67	2,850	88,255	2,850	100.00 %	3.23 %
Tryon	113	1,562	89,058	1,562	100.00 %	1.75 %
Turkey	22	213	88,642	213	100.00 %	0.24 %
Unionville	69	6,643	85,179	6,643	100.00 %	7.80 %
Valdese	86	4,689	87,570	4,689	100.00 %	5.35 %
Vanceboro	3	869	85,099	869	100.00 %	1.02 %
Vandemere	79	246	83,163	246	100.00 %	0.30 %
Varnamtown	19	525	91,041	525	100.00 %	0.58 %
Vass	51	952	83,073	952	100.00 %	1.15 %
Waco	110	310	88,397	310	100.00 %	0.35 %
Wade	43	638	82,956	638	100.00 %	0.77 %
Wadesboro	55	5,008	87,005	5,008	100.00 %	5.76 %
Wagram	48	615	86,256	615	100.00 %	0.71 %
Wake Forest (Franklin)	7	1,504	83,510	1,504	100.00 %	1.80 %
Wake Forest (Wake)	35	46,097	88,374	46,097	100.00 %	52.16 %
	66	46,097	83,189	0	0.00 %	0.00 %
Walkertown	71	5,692	84,874	3,176	55.80 %	3.74 %
	75	5,692	84,220	2,516	44.20 %	2.99 %
Wallace (Duplin)	4	3,413	83,095	3,413	100.00 %	4.11 %
Wallace (Pender)	16	0	90,663	0	0.00 %	0.00 %
Wallburg	80	3,051	84,864	3,051	100.00 %	3.60 %
Walnut Cove	91	1,586	86,210	1,586	100.00 %	1.84 %
Walnut Creek	4	1,084	83,095	1,084	100.00 %	1.30 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Walstonburg	12	193	84,745	193	100.00 %	0.23 %
Warrenton	27	851	84,735	851	100.00 %	1.00 %
Warsaw	4	2,733	83,095	2,733	100.00 %	3.29 %
Washington	79	9,875	83,163	9,875	100.00 %	11.87 %
Washington Park	79	392	83,163	392	100.00 %	0.47 %
Watha	16	181	90,663	181	100.00 %	0.20 %
Waxhaw	55	20,534	87,005	0	0.00 %	0.00 %
	68	20,534	88,138	20,534	100.00 %	23.30 %
Waynesville	118	10,140	83,282	10,140	100.00 %	12.18 %
Weaverville	114	4,567	89,685	4,567	100.00 %	5.09 %
Webster	119	372	90,212	372	100.00 %	0.41 %
Weddington (Mecklenburg)	103	5	87,132	5	100.00 %	0.01 %
Weddington (Union)	68	13,176	88,138	13,172	99.97 %	14.94 %
	69	13,176	85,179	4	0.03 %	0.00 %
Weldon	27	1,444	84,735	1,444	100.00 %	1.70 %
Wendell	39	9,793	90,164	9,793	100.00 %	10.86 %
Wentworth	65	2,662	91,096	2,662	100.00 %	2.92 %
Wesley Chapel	55	8,681	87,005	3,868	44.56 %	4.45 %
	68	8,681	88,138	4,813	55.44 %	5.46 %
West Jefferson	93	1,279	86,445	1,279	100.00 %	1.48 %
Whispering Pines	52	4,987	84,383	4,987	100.00 %	5.91 %
Whitakers (Edgecombe)	23	290	88,865	290	100.00 %	0.33 %
Whitakers (Nash)	25	337	86,534	337	100.00 %	0.39 %
White Lake	22	843	88,642	843	100.00 %	0.95 %
Whiteville	46	4,766	83,445	4,766	100.00 %	5.71 %
Whitsett	59	584	90,361	584	100.00 %	0.65 %
Wilkesboro	94	3,687	90,835	3,687	100.00 %	4.06 %
Williamston	23	5,248	88,865	5,248	100.00 %	5.91 %
Wilmington	18	115,451	91,245	48,680	42.17 %	53.35 %
	19	115,451	91,041	8,207	7.11 %	9.01 %
	20	115,451	90,346	58,564	50.73 %	64.82 %
Wilson	24	47,851	87,220	47,851	100.00 %	54.86 %
Wilson's Mills	26	2,534	89,947	0	0.00 %	0.00 %
	28	2,534	85,389	2,534	100.00 %	2.97 %
Windsor	23	3,582	88,865	3,582	100.00 %	4.03 %
Winfall	1	555	84,330	555	100.00 %	0.66 %
Wingate	55	4,055	87,005	4,055	100.00 %	4.66 %

Municipality by County - District Report

District Plan: SL 2021-175 House

Municipality	District	Total Muni Population	Total District Population	Muni Pop in District	Percent of Muni Pop in District	Percent of District Pop in Muni
Winston-Salem	71	249,545	84,874	77,631	31.11 %	91.47 %
	72	249,545	86,949	86,867	34.81 %	99.91 %
	74	249,545	84,857	32,409	12.99 %	38.19 %
	75	249,545	84,220	22,818	9.14 %	27.09 %
	91	249,545	86,210	29,820	11.95 %	34.59 %
Winterville	8	10,462	85,793	44	0.42 %	0.05 %
	9	10,462	84,450	10,418	99.58 %	12.34 %
Winton	5	629	82,953	629	100.00 %	0.76 %
Woodfin	114	7,936	89,685	7,648	96.37 %	8.53 %
	116	7,936	89,505	288	3.63 %	0.32 %
Woodland	27	557	84,735	557	100.00 %	0.66 %
Wrightsville Beach	20	2,473	90,346	2,473	100.00 %	2.74 %
Yadkinville	77	2,995	90,628	2,995	100.00 %	3.30 %
Yanceyville	50	1,937	85,345	1,937	100.00 %	2.27 %
Youngsville	7	2,016	83,510	2,016	100.00 %	2.41 %
Zebulon (Johnston)	26	0	89,947	0	0.00 %	0.00 %
Zebulon (Wake)	39	6,903	90,164	6,903	100.00 %	7.66 %
			Total:	**6,017,605**		

Number of municipalities split within counties: 81

Display: all municipalities

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
1	Columbia	84,330	610	610	0.72 %	100.00 %
	Creswell	84,330	207	207	0.25 %	100.00 %
	Duck	84,330	742	742	0.88 %	100.00 %
	Edenton	84,330	4,460	4,460	5.29 %	100.00 %
	Hertford	84,330	1,934	1,934	2.29 %	100.00 %
	Kill Devil Hills	84,330	7,656	7,118	8.44 %	92.97 %
	Kitty Hawk	84,330	3,689	3,689	4.37 %	100.00 %
	Plymouth	84,330	3,320	3,320	3.94 %	100.00 %
	Roper	84,330	485	485	0.58 %	100.00 %
	Southern Shores	84,330	3,090	3,090	3.66 %	100.00 %
	Winfall	84,330	555	555	0.66 %	100.00 %
2	Durham (Durham)	90,793	283,093	25,167	27.72 %	8.89 %
	Raleigh (Durham)	90,793	1,559	1,326	1.46 %	85.05 %
	Roxboro	90,793	8,134	8,134	8.96 %	100.00 %
3	Bridgeton	85,099	349	349	0.41 %	100.00 %
	Cove City	85,099	378	378	0.44 %	100.00 %
	Dover	85,099	349	349	0.41 %	100.00 %
	Havelock	85,099	16,621	5,986	7.03 %	36.01 %
	New Bern	85,099	31,291	31,291	36.77 %	100.00 %
	River Bend	85,099	2,902	2,902	3.41 %	100.00 %
	Trent Woods	85,099	4,074	4,074	4.79 %	100.00 %
	Vanceboro	85,099	869	869	1.02 %	100.00 %
4	Beulaville	83,095	1,116	1,116	1.34 %	100.00 %
	Calypso	83,095	327	327	0.39 %	100.00 %
	Faison (Duplin)	83,095	784	784	0.94 %	100.00 %
	Goldsboro	83,095	33,657	5	0.01 %	0.01 %
	Greenevers	83,095	567	567	0.68 %	100.00 %
	Harrells (Duplin)	83,095	0	0	0.00 %	0.00 %
	Kenansville	83,095	770	770	0.93 %	100.00 %
	Magnolia	83,095	831	831	1.00 %	100.00 %
	Mount Olive (Duplin)	83,095	5	5	0.01 %	100.00 %
	Mount Olive (Wayne)	83,095	4,193	4,193	5.05 %	100.00 %
	Rose Hill	83,095	1,371	1,371	1.65 %	100.00 %
	Seven Springs	83,095	55	55	0.07 %	100.00 %
	Teachey	83,095	448	448	0.54 %	100.00 %
	Wallace (Duplin)	83,095	3,413	3,413	4.11 %	100.00 %
	Walnut Creek	83,095	1,084	1,084	1.30 %	100.00 %
	Warsaw	83,095	2,733	2,733	3.29 %	100.00 %
5	Ahoskie	82,953	4,891	4,891	5.90 %	100.00 %
	Cofield	82,953	267	267	0.32 %	100.00 %
	Como	82,953	67	67	0.08 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
5	Elizabeth City (Camden)	82,953	38	38	0.05 %	100.00 %
	Elizabeth City (Pasquotank)	82,953	18,593	18,593	22.41 %	100.00 %
	Gatesville	82,953	267	267	0.32 %	100.00 %
	Harrellsville	82,953	85	85	0.10 %	100.00 %
	Murfreesboro	82,953	2,619	2,619	3.16 %	100.00 %
	Winton	82,953	629	629	0.76 %	100.00 %
6	Angier (Harnett)	87,332	4,709	4,709	5.39 %	100.00 %
	Broadway (Harnett)	87,332	0	0	0.00 %	0.00 %
	Fuquay-Varina (Harnett)	87,332	0	0	0.00 %	0.00 %
	Lillington	87,332	4,735	882	1.01 %	18.63 %
7	Bunn	83,510	327	327	0.39 %	100.00 %
	Creedmoor	83,510	4,866	2,065	2.47 %	42.44 %
	Franklinton	83,510	2,456	2,456	2.94 %	100.00 %
	Louisburg	83,510	3,064	3,064	3.67 %	100.00 %
	Wake Forest (Franklin)	83,510	1,504	1,504	1.80 %	100.00 %
	Youngsville	83,510	2,016	2,016	2.41 %	100.00 %
8	Bethel	85,793	1,373	1,373	1.60 %	100.00 %
	Falkland	85,793	47	47	0.05 %	100.00 %
	Farmville	85,793	4,461	4,461	5.20 %	100.00 %
	Fountain	85,793	385	385	0.45 %	100.00 %
	Greenville	85,793	87,521	52,881	61.64 %	60.42 %
	Winterville	85,793	10,462	44	0.05 %	0.42 %
9	Ayden	84,450	4,977	4,977	5.89 %	100.00 %
	Greenville	84,450	87,521	34,640	41.02 %	39.58 %
	Grifton (Pitt)	84,450	2,301	2,301	2.72 %	100.00 %
	Grimesland	84,450	386	386	0.46 %	100.00 %
	Simpson	84,450	390	390	0.46 %	100.00 %
	Winterville	84,450	10,462	10,418	12.34 %	99.58 %
10	Eureka	82,953	214	214	0.26 %	100.00 %
	Fremont	82,953	1,196	1,196	1.44 %	100.00 %
	Goldsboro	82,953	33,657	33,652	40.57 %	99.99 %
	Pikeville	82,953	712	712	0.86 %	100.00 %
11	Apex	86,298	58,780	0	0.00 %	0.00 %
	Cary (Wake)	86,298	171,012	43,537	50.45 %	25.46 %
	Morrisville (Wake)	86,298	29,423	0	0.00 %	0.00 %
	Raleigh (Wake)	86,298	466,106	40,792	47.27 %	8.75 %
12	Grifton (Lenoir)	84,745	147	147	0.17 %	100.00 %
	Hookerton	84,745	413	413	0.49 %	100.00 %
	Kinston	84,745	19,900	19,900	23.48 %	100.00 %
	La Grange	84,745	2,595	2,595	3.06 %	100.00 %
	Maysville	84,745	818	818	0.97 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
12	Pink Hill	84,745	451	451	0.53 %	100.00 %
	Pollocksville	84,745	268	268	0.32 %	100.00 %
	Snow Hill	84,745	1,481	1,481	1.75 %	100.00 %
	Trenton	84,745	238	238	0.28 %	100.00 %
	Walstonburg	84,745	193	193	0.23 %	100.00 %
13	Atlantic Beach	83,307	1,364	1,364	1.64 %	100.00 %
	Beaufort	83,307	4,464	4,464	5.36 %	100.00 %
	Bogue	83,307	695	695	0.83 %	100.00 %
	Cape Carteret	83,307	2,224	2,224	2.67 %	100.00 %
	Cedar Point	83,307	1,764	1,764	2.12 %	100.00 %
	Emerald Isle	83,307	3,847	3,847	4.62 %	100.00 %
	Havelock	83,307	16,621	10,635	12.77 %	63.99 %
	Indian Beach	83,307	223	223	0.27 %	100.00 %
	Morehead City	83,307	9,556	9,556	11.47 %	100.00 %
	Newport	83,307	4,364	4,364	5.24 %	100.00 %
	Peletier	83,307	769	769	0.92 %	100.00 %
	Pine Knoll Shores	83,307	1,388	1,388	1.67 %	100.00 %
14	Jacksonville	86,538	72,723	28,456	32.88 %	39.13 %
	Swansboro	86,538	3,744	3,744	4.33 %	100.00 %
15	Holly Ridge	87,578	4,171	4,171	4.76 %	100.00 %
	Jacksonville	87,578	72,723	44,267	50.55 %	60.87 %
	North Topsail Beach	87,578	1,005	1,005	1.15 %	100.00 %
	Surf City (Onslow)	87,578	334	334	0.38 %	100.00 %
16	Atkinson	90,663	296	296	0.33 %	100.00 %
	Burgaw	90,663	3,088	3,088	3.41 %	100.00 %
	Richlands	90,663	2,287	2,287	2.52 %	100.00 %
	St. Helena	90,663	417	417	0.46 %	100.00 %
	Surf City (Pender)	90,663	3,533	3,533	3.90 %	100.00 %
	Topsail Beach	90,663	461	461	0.51 %	100.00 %
	Wallace (Pender)	90,663	0	0	0.00 %	0.00 %
	Watha	90,663	181	181	0.20 %	100.00 %
17	Belville	89,763	2,406	2,406	2.68 %	100.00 %
	Calabash	89,763	2,011	2,011	2.24 %	100.00 %
	Carolina Shores	89,763	4,588	4,588	5.11 %	100.00 %
	Holden Beach	89,763	921	0	0.00 %	0.00 %
	Leland	89,763	22,908	22,908	25.52 %	100.00 %
	Navassa	89,763	1,367	1,367	1.52 %	100.00 %
	Northwest	89,763	703	703	0.78 %	100.00 %
	Ocean Isle Beach	89,763	867	867	0.97 %	100.00 %
	Sandy Creek	89,763	248	248	0.28 %	100.00 %
	Shallotte	89,763	4,185	4,185	4.66 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
17	Sunset Beach	89,763	4,175	4,175	4.65 %	100.00 %
18	Wilmington	91,245	115,451	48,680	53.35 %	42.17 %
19	Bald Head Island	91,041	268	268	0.29 %	100.00 %
	Boiling Spring Lakes	91,041	5,943	5,943	6.53 %	100.00 %
	Bolivia	91,041	149	149	0.16 %	100.00 %
	Carolina Beach	91,041	6,564	6,564	7.21 %	100.00 %
	Caswell Beach	91,041	395	395	0.43 %	100.00 %
	Holden Beach	91,041	921	921	1.01 %	100.00 %
	Kure Beach	91,041	2,191	2,191	2.41 %	100.00 %
	Oak Island	91,041	8,396	8,396	9.22 %	100.00 %
	Southport	91,041	3,971	3,971	4.36 %	100.00 %
	St. James	91,041	6,529	6,529	7.17 %	100.00 %
	Varnamtown	91,041	525	525	0.58 %	100.00 %
	Wilmington	91,041	115,451	8,207	9.01 %	7.11 %
20	Wilmington	90,346	115,451	58,564	64.82 %	50.73 %
	Wrightsville Beach	90,346	2,473	2,473	2.74 %	100.00 %
21	Apex	86,179	58,780	556	0.65 %	0.95 %
	Cary (Wake)	86,179	171,012	30,622	35.53 %	17.91 %
	Fuquay-Varina (Wake)	86,179	34,152	30	0.03 %	0.09 %
	Garner	86,179	31,159	11,789	13.68 %	37.83 %
	Holly Springs	86,179	41,239	11,892	13.80 %	28.84 %
	Raleigh (Wake)	86,179	466,106	13	0.02 %	0.00 %
22	Autryville	88,642	167	167	0.19 %	100.00 %
	Bladenboro	88,642	1,648	1,648	1.86 %	100.00 %
	Clarkton	88,642	614	614	0.69 %	100.00 %
	Clinton	88,642	8,383	8,383	9.46 %	100.00 %
	Dublin	88,642	267	267	0.30 %	100.00 %
	East Arcadia	88,642	418	418	0.47 %	100.00 %
	Elizabethtown	88,642	3,296	3,296	3.72 %	100.00 %
	Faison (Sampson)	88,642	0	0	0.00 %	0.00 %
	Falcon (Sampson)	88,642	0	0	0.00 %	0.00 %
	Garland	88,642	595	595	0.67 %	100.00 %
	Harrells (Sampson)	88,642	160	160	0.18 %	100.00 %
	Newton Grove	88,642	585	585	0.66 %	100.00 %
	Roseboro	88,642	1,163	1,163	1.31 %	100.00 %
	Salemburg	88,642	457	457	0.52 %	100.00 %
	Tar Heel	88,642	90	90	0.10 %	100.00 %
	Turkey	88,642	213	213	0.24 %	100.00 %
	White Lake	88,642	843	843	0.95 %	100.00 %
23	Askewville	88,865	184	184	0.21 %	100.00 %
	Aulander	88,865	763	763	0.86 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
23	Bear Grass	88,865	89	89	0.10 %	100.00 %
	Colerain	88,865	217	217	0.24 %	100.00 %
	Conetoe	88,865	198	198	0.22 %	100.00 %
	Everetts	88,865	150	150	0.17 %	100.00 %
	Hamilton	88,865	306	306	0.34 %	100.00 %
	Hassell	88,865	49	49	0.06 %	100.00 %
	Jamesville	88,865	424	424	0.48 %	100.00 %
	Kelford	88,865	203	203	0.23 %	100.00 %
	Leggett	88,865	37	37	0.04 %	100.00 %
	Lewiston Woodville	88,865	426	426	0.48 %	100.00 %
	Macclesfield	88,865	413	413	0.46 %	100.00 %
	Oak City	88,865	266	266	0.30 %	100.00 %
	Parmele	88,865	243	243	0.27 %	100.00 %
	Pinetops	88,865	1,200	1,200	1.35 %	100.00 %
	Powellsville	88,865	189	189	0.21 %	100.00 %
	Princeville	88,865	1,254	1,254	1.41 %	100.00 %
	Robersonville	88,865	1,269	1,269	1.43 %	100.00 %
	Rocky Mount (Edgecombe)	88,865	15,414	15,414	17.35 %	100.00 %
	Roxobel	88,865	187	187	0.21 %	100.00 %
	Sharpsburg (Edgecombe)	88,865	215	215	0.24 %	100.00 %
	Speed	88,865	63	63	0.07 %	100.00 %
	Tarboro	88,865	10,721	10,721	12.06 %	100.00 %
	Whitakers (Edgecombe)	88,865	290	290	0.33 %	100.00 %
	Williamston	88,865	5,248	5,248	5.91 %	100.00 %
	Windsor	88,865	3,582	3,582	4.03 %	100.00 %
24	Bailey	87,220	568	568	0.65 %	100.00 %
	Black Creek	87,220	692	692	0.79 %	100.00 %
	Elm City (Wilson)	87,220	1,218	1,218	1.40 %	100.00 %
	Kenly (Wilson)	87,220	198	198	0.23 %	100.00 %
	Lucama	87,220	1,036	1,036	1.19 %	100.00 %
	Middlesex	87,220	912	912	1.05 %	100.00 %
	Saratoga	87,220	353	353	0.40 %	100.00 %
	Sharpsburg (Wilson)	87,220	421	421	0.48 %	100.00 %
	Sims	87,220	275	275	0.32 %	100.00 %
	Stantonsburg	87,220	762	762	0.87 %	100.00 %
	Wilson	87,220	47,851	47,851	54.86 %	100.00 %
25	Castalia	86,534	264	264	0.31 %	100.00 %
	Dortches	86,534	1,082	1,082	1.25 %	100.00 %
	Elm City (Nash)	86,534	0	0	0.00 %	0.00 %
	Momeyer	86,534	277	277	0.32 %	100.00 %
	Nashville	86,534	5,632	5,632	6.51 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
25	Red Oak	86,534	3,342	3,342	3.86 %	100.00 %
	Rocky Mount (Nash)	86,534	38,927	38,927	44.98 %	100.00 %
	Sharpsburg (Nash)	86,534	1,061	1,061	1.23 %	100.00 %
	Spring Hope	86,534	1,309	1,309	1.51 %	100.00 %
	Whitakers (Nash)	86,534	337	337	0.39 %	100.00 %
26	Archer Lodge	89,947	4,797	4,797	5.33 %	100.00 %
	Clayton (Johnston)	89,947	26,307	26,307	29.25 %	100.00 %
	Wilson's Mills	89,947	2,534	0	0.00 %	0.00 %
	Zebulon (Johnston)	89,947	0	0	0.00 %	0.00 %
27	Conway	84,735	752	752	0.89 %	100.00 %
	Enfield	84,735	1,865	1,865	2.20 %	100.00 %
	Garysburg	84,735	904	904	1.07 %	100.00 %
	Gaston	84,735	1,008	1,008	1.19 %	100.00 %
	Halifax	84,735	170	170	0.20 %	100.00 %
	Hobgood	84,735	268	268	0.32 %	100.00 %
	Jackson	84,735	430	430	0.51 %	100.00 %
	Lasker	84,735	64	64	0.08 %	100.00 %
	Littleton	84,735	559	559	0.66 %	100.00 %
	Macon	84,735	110	110	0.13 %	100.00 %
	Norlina	84,735	920	920	1.09 %	100.00 %
	Rich Square	84,735	894	894	1.06 %	100.00 %
	Roanoke Rapids	84,735	15,229	15,229	17.97 %	100.00 %
	Scotland Neck	84,735	1,640	1,640	1.94 %	100.00 %
	Seaboard	84,735	542	542	0.64 %	100.00 %
	Severn	84,735	191	191	0.23 %	100.00 %
	Warrenton	84,735	851	851	1.00 %	100.00 %
	Weldon	84,735	1,444	1,444	1.70 %	100.00 %
	Woodland	84,735	557	557	0.66 %	100.00 %
28	Benson (Johnston)	85,389	3,967	3,967	4.65 %	100.00 %
	Four Oaks	85,389	2,158	2,158	2.53 %	100.00 %
	Kenly (Johnston)	85,389	1,293	1,293	1.51 %	100.00 %
	Micro	85,389	458	458	0.54 %	100.00 %
	Pine Level	85,389	2,046	2,046	2.40 %	100.00 %
	Princeton	85,389	1,315	1,315	1.54 %	100.00 %
	Selma	85,389	6,317	6,317	7.40 %	100.00 %
	Smithfield	85,389	11,292	11,292	13.22 %	100.00 %
	Wilson's Mills	85,389	2,534	2,534	2.97 %	100.00 %
29	Chapel Hill (Durham)	91,212	2,906	2,906	3.19 %	100.00 %
	Durham (Durham)	91,212	283,093	87,035	95.42 %	30.74 %
30	Durham (Durham)	91,165	283,093	89,671	98.36 %	31.68 %
31	Durham (Durham)	90,760	283,093	81,220	89.49 %	28.69 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
31	Morrisville (Durham)	90,760	207	207	0.23 %	100.00 %
	Raleigh (Durham)	90,760	1,559	233	0.26 %	14.95 %
32	Butner	88,633	8,397	8,397	9.47 %	100.00 %
	Creedmoor	88,633	4,866	2,801	3.16 %	57.56 %
	Henderson	88,633	15,060	15,060	16.99 %	100.00 %
	Kittrell	88,633	132	132	0.15 %	100.00 %
	Middleburg	88,633	101	101	0.11 %	100.00 %
	Oxford	88,633	8,628	8,628	9.73 %	100.00 %
	Stem	88,633	960	960	1.08 %	100.00 %
	Stovall	88,633	324	324	0.37 %	100.00 %
33	Garner	83,049	31,159	14	0.02 %	0.04 %
	Raleigh (Wake)	83,049	466,106	82,480	99.31 %	17.70 %
34	Raleigh (Wake)	83,679	466,106	83,503	99.79 %	17.92 %
35	Raleigh (Wake)	88,374	466,106	6,171	6.98 %	1.32 %
	Rolesville	88,374	9,475	9,467	10.71 %	99.92 %
	Wake Forest (Wake)	88,374	46,097	46,097	52.16 %	100.00 %
36	Apex	90,166	58,780	57,843	64.15 %	98.41 %
	Cary (Wake)	90,166	171,012	0	0.00 %	0.00 %
	Fuquay-Varina (Wake)	90,166	34,152	16	0.02 %	0.05 %
	Holly Springs	90,166	41,239	17,734	19.67 %	43.00 %
37	Angier (Wake)	90,867	556	556	0.61 %	100.00 %
	Cary (Wake)	90,867	171,012	2,012	2.21 %	1.18 %
	Fuquay-Varina (Wake)	90,867	34,152	34,106	37.53 %	99.87 %
	Garner	90,867	31,159	0	0.00 %	0.00 %
	Holly Springs	90,867	41,239	11,613	12.78 %	28.16 %
38	Clayton (Wake)	88,226	0	0	0.00 %	0.00 %
	Garner	88,226	31,159	19,356	21.94 %	62.12 %
	Knightdale	88,226	19,435	0	0.00 %	0.00 %
	Raleigh (Wake)	88,226	466,106	56,840	64.43 %	12.19 %
39	Clayton (Wake)	90,164	0	0	0.00 %	0.00 %
	Knightdale	90,164	19,435	19,435	21.56 %	100.00 %
	Raleigh (Wake)	90,164	466,106	13,011	14.43 %	2.79 %
	Rolesville	90,164	9,475	8	0.01 %	0.08 %
	Wendell	90,164	9,793	9,793	10.86 %	100.00 %
	Zebulon (Wake)	90,164	6,903	6,903	7.66 %	100.00 %
40	Durham (Wake)	83,175	269	269	0.32 %	100.00 %
	Raleigh (Wake)	83,175	466,106	57,345	68.94 %	12.30 %
41	Apex	89,887	58,780	381	0.42 %	0.65 %
	Cary (Wake)	89,887	171,012	74,074	82.41 %	43.32 %
	Morrisville (Wake)	89,887	29,423	14,239	15.84 %	48.39 %
42	Fayetteville	85,537	208,501	65,401	76.46 %	31.37 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
42	Spring Lake	85,537	11,660	11,660	13.63 %	100.00 %
43	Eastover	82,956	3,656	3,656	4.41 %	100.00 %
	Falcon (Cumberland)	82,956	324	324	0.39 %	100.00 %
	Fayetteville	82,956	208,501	44,532	53.68 %	21.36 %
	Godwin	82,956	128	128	0.15 %	100.00 %
	Hope Mills	82,956	17,808	64	0.08 %	0.36 %
	Linden	82,956	136	136	0.16 %	100.00 %
	Stedman	82,956	1,277	1,277	1.54 %	100.00 %
	Wade	82,956	638	638	0.77 %	100.00 %
44	Fayetteville	83,297	208,501	83,293	100.00 %	39.95 %
45	Fayetteville	82,938	208,501	15,275	18.42 %	7.33 %
	Hope Mills	82,938	17,808	17,744	21.39 %	99.64 %
46	Boardman	83,445	166	166	0.20 %	100.00 %
	Bolton	83,445	519	519	0.62 %	100.00 %
	Brunswick	83,445	973	973	1.17 %	100.00 %
	Cerro Gordo	83,445	131	131	0.16 %	100.00 %
	Chadbourn	83,445	1,574	1,574	1.89 %	100.00 %
	Fair Bluff	83,445	709	709	0.85 %	100.00 %
	Fairmont	83,445	2,191	2,191	2.63 %	100.00 %
	Lake Waccamaw	83,445	1,296	1,296	1.55 %	100.00 %
	Lumberton	83,445	19,025	350	0.42 %	1.84 %
	Marietta	83,445	111	111	0.13 %	100.00 %
	Maxton (Robeson)	83,445	1,902	1,902	2.28 %	100.00 %
	McDonald	83,445	94	94	0.11 %	100.00 %
	Orrum	83,445	59	59	0.07 %	100.00 %
	Proctorville	83,445	121	121	0.15 %	100.00 %
	Raynham	83,445	60	60	0.07 %	100.00 %
	Rowland	83,445	885	885	1.06 %	100.00 %
	Sandyfield	83,445	430	430	0.52 %	100.00 %
	Tabor City	83,445	3,781	3,781	4.53 %	100.00 %
	Whiteville	83,445	4,766	4,766	5.71 %	100.00 %
47	Fairmont	83,708	2,191	0	0.00 %	0.00 %
	Lumber Bridge	83,708	82	82	0.10 %	100.00 %
	Lumberton	83,708	19,025	18,675	22.31 %	98.16 %
	Parkton	83,708	504	504	0.60 %	100.00 %
	Pembroke	83,708	2,823	2,823	3.37 %	100.00 %
	Red Springs (Robeson)	83,708	3,087	3,087	3.69 %	100.00 %
	Rennert	83,708	275	275	0.33 %	100.00 %
	St. Pauls	83,708	2,045	2,045	2.44 %	100.00 %
48	East Laurinburg	86,256	234	234	0.27 %	100.00 %
	Gibson	86,256	449	449	0.52 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
48	Laurinburg	86,256	14,978	14,978	17.36 %	100.00 %
	Maxton (Scotland)	86,256	208	208	0.24 %	100.00 %
	Raeford	86,256	4,559	4,559	5.29 %	100.00 %
	Red Springs (Hoke)	86,256	0	0	0.00 %	0.00 %
	Wagram	86,256	615	615	0.71 %	100.00 %
49	Cary (Wake)	86,157	171,012	20,767	24.10 %	12.14 %
	Durham (Wake)	86,157	269	0	0.00 %	0.00 %
	Morrisville (Wake)	86,157	29,423	15,184	17.62 %	51.61 %
	Raleigh (Wake)	86,157	466,106	47,783	55.46 %	10.25 %
50	Carrboro	85,345	21,295	174	0.20 %	0.82 %
	Durham (Orange)	85,345	144	144	0.17 %	100.00 %
	Hillsborough	85,345	9,660	9,660	11.32 %	100.00 %
	Mebane (Orange)	85,345	3,171	3,171	3.72 %	100.00 %
	Milton	85,345	155	155	0.18 %	100.00 %
	Yanceyville	85,345	1,937	1,937	2.27 %	100.00 %
51	Broadway (Lee)	83,073	1,267	1,267	1.53 %	100.00 %
	Cameron	83,073	244	244	0.29 %	100.00 %
	Carthage	83,073	2,775	2,747	3.31 %	98.99 %
	Sanford	83,073	30,261	30,261	36.43 %	100.00 %
	Vass	83,073	952	952	1.15 %	100.00 %
52	Aberdeen	84,383	8,516	8,516	10.09 %	100.00 %
	Carthage	84,383	2,775	28	0.03 %	1.01 %
	Dobbins Heights	84,383	687	687	0.81 %	100.00 %
	Ellerbe	84,383	864	864	1.02 %	100.00 %
	Foxfire	84,383	1,288	0	0.00 %	0.00 %
	Hamlet	84,383	6,025	6,025	7.14 %	100.00 %
	Hoffman	84,383	418	418	0.50 %	100.00 %
	Norman	84,383	100	100	0.12 %	100.00 %
	Pinebluff	84,383	1,473	1,473	1.75 %	100.00 %
	Pinehurst	84,383	17,581	8	0.01 %	0.05 %
	Rockingham	84,383	9,243	9,243	10.95 %	100.00 %
	Southern Pines	84,383	15,545	15,545	18.42 %	100.00 %
	Taylortown	84,383	634	4	0.00 %	0.63 %
	Whispering Pines	84,383	4,987	4,987	5.91 %	100.00 %
53	Benson (Harnett)	86,899	0	0	0.00 %	0.00 %
	Coats	86,899	2,155	2,155	2.48 %	100.00 %
	Dunn	86,899	8,446	8,446	9.72 %	100.00 %
	Erwin	86,899	4,542	4,542	5.23 %	100.00 %
	Lillington	86,899	4,735	3,853	4.43 %	81.37 %
54	Cary (Chatham)	83,475	3,709	3,709	4.44 %	100.00 %
	Goldston	83,475	234	234	0.28 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
54	Liberty	83,475	2,655	2,655	3.18 %	100.00 %
	Pittsboro	83,475	4,537	4,537	5.44 %	100.00 %
	Siler City	83,475	7,702	7,702	9.23 %	100.00 %
	Staley	83,475	397	397	0.48 %	100.00 %
55	Ansonville	87,005	440	440	0.51 %	100.00 %
	Indian Trail	87,005	39,997	2,376	2.73 %	5.94 %
	Lilesville	87,005	395	395	0.45 %	100.00 %
	Marshville	87,005	2,522	2,522	2.90 %	100.00 %
	McFarlan	87,005	94	94	0.11 %	100.00 %
	Mineral Springs	87,005	3,159	2,293	2.64 %	72.59 %
	Monroe	87,005	34,562	12,650	14.54 %	36.60 %
	Morven	87,005	329	329	0.38 %	100.00 %
	Peachland	87,005	390	390	0.45 %	100.00 %
	Polkton	87,005	2,250	2,250	2.59 %	100.00 %
	Wadesboro	87,005	5,008	5,008	5.76 %	100.00 %
	Waxhaw	87,005	20,534	0	0.00 %	0.00 %
	Wesley Chapel	87,005	8,681	3,868	4.45 %	44.56 %
	Wingate	87,005	4,055	4,055	4.66 %	100.00 %
56	Carrboro	86,087	21,295	21,121	24.53 %	99.18 %
	Chapel Hill (Orange)	86,087	59,054	59,054	68.60 %	100.00 %
57	Greensboro	90,615	299,035	83,540	92.19 %	27.94 %
	Summerfield	90,615	10,951	746	0.82 %	6.81 %
58	Greensboro	90,808	299,035	84,725	93.30 %	28.33 %
59	Burlington (Guilford)	90,361	1,822	1,822	2.02 %	100.00 %
	Gibsonville (Guilford)	90,361	4,642	4,642	5.14 %	100.00 %
	Greensboro	90,361	299,035	13,852	15.33 %	4.63 %
	Pleasant Garden	90,361	5,000	5,000	5.53 %	100.00 %
	Sedalia	90,361	676	676	0.75 %	100.00 %
	Summerfield	90,361	10,951	2,509	2.78 %	22.91 %
	Whitsett	90,361	584	584	0.65 %	100.00 %
60	Archdale (Guilford)	89,735	380	380	0.42 %	100.00 %
	Greensboro	89,735	299,035	8,829	9.84 %	2.95 %
	High Point (Guilford)	89,735	107,321	66,033	73.59 %	61.53 %
	Jamestown	89,735	3,668	3,668	4.09 %	100.00 %
61	Greensboro	90,201	299,035	90,201	100.00 %	30.16 %
62	Greensboro	89,579	299,035	17,888	19.97 %	5.98 %
	High Point (Guilford)	89,579	107,321	41,288	46.09 %	38.47 %
	Kernersville (Guilford)	89,579	502	502	0.56 %	100.00 %
	Oak Ridge	89,579	7,474	7,474	8.34 %	100.00 %
	Stokesdale	89,579	5,924	5,924	6.61 %	100.00 %
	Summerfield	89,579	10,951	7,696	8.59 %	70.28 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
63	Burlington (Alamance)	86,399	55,481	25,917	30.00 %	46.71 %
	Graham	86,399	17,157	17,157	19.86 %	100.00 %
	Green Level	86,399	3,152	3,152	3.65 %	100.00 %
	Haw River	86,399	2,252	2,252	2.61 %	100.00 %
	Mebane (Alamance)	86,399	14,626	14,626	16.93 %	100.00 %
	Swepsonville	86,399	2,445	2,445	2.83 %	100.00 %
64	Alamance	85,016	988	988	1.16 %	100.00 %
	Burlington (Alamance)	85,016	55,481	29,564	34.77 %	53.29 %
	Elon	85,016	11,336	11,336	13.33 %	100.00 %
	Gibsonville (Alamance)	85,016	4,278	4,278	5.03 %	100.00 %
	Ossipee	85,016	536	536	0.63 %	100.00 %
65	Eden	91,096	15,421	15,421	16.93 %	100.00 %
	Madison	91,096	2,129	2,129	2.34 %	100.00 %
	Mayodan	91,096	2,418	2,418	2.65 %	100.00 %
	Reidsville	91,096	14,583	14,583	16.01 %	100.00 %
	Stoneville	91,096	1,308	1,308	1.44 %	100.00 %
	Wentworth	91,096	2,662	2,662	2.92 %	100.00 %
66	Raleigh (Wake)	83,189	466,106	78,168	93.96 %	16.77 %
	Wake Forest (Wake)	83,189	46,097	0	0.00 %	0.00 %
67	Albemarle	88,255	16,432	16,432	18.62 %	100.00 %
	Badin	88,255	2,024	2,024	2.29 %	100.00 %
	Biscoe	88,255	1,848	1,848	2.09 %	100.00 %
	Candor (Montgomery)	88,255	813	813	0.92 %	100.00 %
	Locust (Stanly)	88,255	3,996	3,996	4.53 %	100.00 %
	Misenheimer	88,255	650	650	0.74 %	100.00 %
	Mount Gilead	88,255	1,171	1,171	1.33 %	100.00 %
	New London	88,255	607	607	0.69 %	100.00 %
	Norwood	88,255	2,367	2,367	2.68 %	100.00 %
	Oakboro	88,255	2,128	2,128	2.41 %	100.00 %
	Red Cross	88,255	762	762	0.86 %	100.00 %
	Richfield	88,255	582	582	0.66 %	100.00 %
	Stanfield	88,255	1,585	1,585	1.80 %	100.00 %
	Star	88,255	806	806	0.91 %	100.00 %
	Troy	88,255	2,850	2,850	3.23 %	100.00 %
68	Indian Trail	88,138	39,997	15,036	17.06 %	37.59 %
	Marvin	88,138	6,358	6,358	7.21 %	100.00 %
	Mineral Springs	88,138	3,159	866	0.98 %	27.41 %
	Stallings (Union)	88,138	15,728	0	0.00 %	0.00 %
	Waxhaw	88,138	20,534	20,534	23.30 %	100.00 %
	Weddington (Union)	88,138	13,176	13,172	14.94 %	99.97 %
	Wesley Chapel	88,138	8,681	4,813	5.46 %	55.44 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
69	Fairview	85,179	3,456	3,456	4.06 %	100.00 %
	Hemby Bridge	85,179	1,614	1,614	1.89 %	100.00 %
	Indian Trail	85,179	39,997	22,585	26.51 %	56.47 %
	Lake Park	85,179	3,269	3,269	3.84 %	100.00 %
	Mint Hill (Union)	85,179	6	6	0.01 %	100.00 %
	Monroe	85,179	34,562	21,912	25.72 %	63.40 %
	Stallings (Union)	85,179	15,728	15,728	18.46 %	100.00 %
	Unionville	85,179	6,643	6,643	7.80 %	100.00 %
	Weddington (Union)	85,179	13,176	4	0.00 %	0.03 %
70	Archdale (Randolph)	89,118	11,527	11,527	12.93 %	100.00 %
	Asheboro	89,118	27,156	25,890	29.05 %	95.34 %
	High Point (Randolph)	89,118	8	8	0.01 %	100.00 %
	Randleman	89,118	4,595	4,595	5.16 %	100.00 %
	Thomasville (Randolph)	89,118	521	521	0.58 %	100.00 %
	Trinity	89,118	7,006	7,006	7.86 %	100.00 %
71	Kernersville (Forsyth)	84,874	25,947	0	0.00 %	0.00 %
	Walkertown	84,874	5,692	3,176	3.74 %	55.80 %
	Winston-Salem	84,874	249,545	77,631	91.47 %	31.11 %
72	Winston-Salem	86,949	249,545	86,867	99.91 %	34.81 %
73	Concord	90,649	105,240	32,447	35.79 %	30.83 %
	Harrisburg	90,649	18,967	18,967	20.92 %	100.00 %
	Locust (Cabarrus)	90,649	541	541	0.60 %	100.00 %
	Midland (Cabarrus)	90,649	4,684	4,684	5.17 %	100.00 %
	Mount Pleasant	90,649	1,671	1,671	1.84 %	100.00 %
74	Bethania	84,857	344	0	0.00 %	0.00 %
	Clemmons	84,857	21,163	21,163	24.94 %	100.00 %
	Lewisville	84,857	13,381	13,381	15.77 %	100.00 %
	Tobaccoville (Forsyth)	84,857	2,578	824	0.97 %	31.96 %
	Winston-Salem	84,857	249,545	32,409	38.19 %	12.99 %
75	High Point (Forsyth)	84,220	84	84	0.10 %	100.00 %
	Kernersville (Forsyth)	84,220	25,947	25,947	30.81 %	100.00 %
	Walkertown	84,220	5,692	2,516	2.99 %	44.20 %
	Winston-Salem	84,220	249,545	22,818	27.09 %	9.14 %
76	East Spencer	89,815	1,567	1,567	1.74 %	100.00 %
	Faith	89,815	819	819	0.91 %	100.00 %
	Granite Quarry	89,815	2,984	2,984	3.32 %	100.00 %
	Rockwell	89,815	2,302	2,302	2.56 %	100.00 %
	Salisbury	89,815	35,540	35,540	39.57 %	100.00 %
	Spencer	89,815	3,308	3,308	3.68 %	100.00 %
77	Bermuda Run	90,628	3,120	3,120	3.44 %	100.00 %
	Boonville	90,628	1,185	1,185	1.31 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
77	Cleveland	90,628	846	846	0.93 %	100.00 %
	Cooleemee	90,628	940	940	1.04 %	100.00 %
	East Bend	90,628	634	634	0.70 %	100.00 %
	Jonesville	90,628	2,308	2,308	2.55 %	100.00 %
	Mocksville	90,628	5,900	5,900	6.51 %	100.00 %
	Yadkinville	90,628	2,995	2,995	3.30 %	100.00 %
78	Aberdeen	86,365	8,516	0	0.00 %	0.00 %
	Asheboro	86,365	27,156	1,266	1.47 %	4.66 %
	Candor (Moore)	86,365	0	0	0.00 %	0.00 %
	Foxfire	86,365	1,288	1,288	1.49 %	100.00 %
	Franklinville	86,365	1,197	1,197	1.39 %	100.00 %
	Pinehurst	86,365	17,581	17,573	20.35 %	99.95 %
	Ramseur	86,365	1,774	1,774	2.05 %	100.00 %
	Robbins	86,365	1,168	1,168	1.35 %	100.00 %
	Seagrove	86,365	235	235	0.27 %	100.00 %
	Southern Pines	86,365	15,545	0	0.00 %	0.00 %
	Taylortown	86,365	634	630	0.73 %	99.37 %
79	Alliance	83,163	733	733	0.88 %	100.00 %
	Arapahoe	83,163	416	416	0.50 %	100.00 %
	Aurora	83,163	455	455	0.55 %	100.00 %
	Bath	83,163	245	245	0.29 %	100.00 %
	Bayboro	83,163	1,161	1,161	1.40 %	100.00 %
	Belhaven	83,163	1,410	1,410	1.70 %	100.00 %
	Chocowinity	83,163	722	722	0.87 %	100.00 %
	Grantsboro	83,163	692	692	0.83 %	100.00 %
	Kill Devil Hills	83,163	7,656	538	0.65 %	7.03 %
	Manteo	83,163	1,600	1,600	1.92 %	100.00 %
	Mesic	83,163	144	144	0.17 %	100.00 %
	Minnesott Beach	83,163	530	530	0.64 %	100.00 %
	Nags Head	83,163	3,168	3,168	3.81 %	100.00 %
	Oriental	83,163	880	880	1.06 %	100.00 %
	Pantego	83,163	164	164	0.20 %	100.00 %
	Stonewall	83,163	214	214	0.26 %	100.00 %
	Vandemere	83,163	246	246	0.30 %	100.00 %
	Washington	83,163	9,875	9,875	11.87 %	100.00 %
	Washington Park	83,163	392	392	0.47 %	100.00 %
80	Denton	84,864	1,494	1,494	1.76 %	100.00 %
	High Point (Davidson)	84,864	6,646	6,646	7.83 %	100.00 %
	Lexington	84,864	19,632	0	0.00 %	0.00 %
	Midway	84,864	4,742	3,469	4.09 %	73.15 %
	Thomasville (Davidson)	84,864	26,662	26,662	31.42 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
80	Wallburg	84,864	3,051	3,051	3.60 %	100.00 %
81	Lexington	84,066	19,632	19,632	23.35 %	100.00 %
	Midway	84,066	4,742	1,273	1.51 %	26.85 %
82	Concord	90,771	105,240	48,723	53.68 %	46.30 %
	Kannapolis (Cabarrus)	90,771	42,846	33,907	37.35 %	79.14 %
83	China Grove	90,742	4,434	4,434	4.89 %	100.00 %
	Concord	90,742	105,240	24,070	26.53 %	22.87 %
	Kannapolis (Cabarrus)	90,742	42,846	8,939	9.85 %	20.86 %
	Kannapolis (Rowan)	90,742	10,268	10,268	11.32 %	100.00 %
	Landis	90,742	3,690	3,690	4.07 %	100.00 %
84	Harmony	86,773	543	543	0.63 %	100.00 %
	Love Valley	86,773	154	154	0.18 %	100.00 %
	Mooresville	86,773	50,193	205	0.24 %	0.41 %
	Statesville	86,773	28,419	28,415	32.75 %	99.99 %
	Troutman	86,773	3,698	885	1.02 %	23.93 %
85	Bakersville	90,863	450	450	0.50 %	100.00 %
	Banner Elk	90,863	1,049	1,049	1.15 %	100.00 %
	Beech Mountain (Avery)	90,863	62	62	0.07 %	100.00 %
	Burnsville	90,863	1,614	1,614	1.78 %	100.00 %
	Crossnore	90,863	143	143	0.16 %	100.00 %
	Elk Park	90,863	542	542	0.60 %	100.00 %
	Grandfather Village	90,863	95	95	0.10 %	100.00 %
	Marion	90,863	7,717	7,717	8.49 %	100.00 %
	Newland	90,863	715	715	0.79 %	100.00 %
	Old Fort	90,863	811	811	0.89 %	100.00 %
	Seven Devils (Avery)	90,863	38	38	0.04 %	100.00 %
	Spruce Pine	90,863	2,194	2,194	2.41 %	100.00 %
	Sugar Mountain	90,863	371	371	0.41 %	100.00 %
86	Connelly Springs	87,570	1,529	1,529	1.75 %	100.00 %
	Drexel	87,570	1,760	1,760	2.01 %	100.00 %
	Glen Alpine	87,570	1,529	1,529	1.75 %	100.00 %
	Hickory (Burke)	87,570	79	79	0.09 %	100.00 %
	Hildebran	87,570	1,679	1,679	1.92 %	100.00 %
	Long View (Burke)	87,570	735	735	0.84 %	100.00 %
	Morganton	87,570	17,474	17,474	19.95 %	100.00 %
	Rhodhiss (Burke)	87,570	639	639	0.73 %	100.00 %
	Rutherford College (Burke)	87,570	1,226	1,226	1.40 %	100.00 %
	Valdese	87,570	4,689	4,689	5.35 %	100.00 %
87	Blowing Rock (Caldwell)	85,758	91	91	0.11 %	100.00 %
	Blowing Rock (Watauga)	85,758	1,285	5	0.01 %	0.39 %
	Boone	85,758	19,092	595	0.69 %	3.12 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
87	Cajah's Mountain	85,758	2,722	2,722	3.17 %	100.00 %
	Cedar Rock	85,758	301	301	0.35 %	100.00 %
	Gamewell	85,758	3,702	3,702	4.32 %	100.00 %
	Granite Falls	85,758	4,965	4,965	5.79 %	100.00 %
	Hickory (Caldwell)	85,758	32	32	0.04 %	100.00 %
	Hudson	85,758	3,780	3,780	4.41 %	100.00 %
	Lenoir	85,758	18,352	18,352	21.40 %	100.00 %
	Rhodhiss (Caldwell)	85,758	358	358	0.42 %	100.00 %
	Rutherford College (Caldwell)	85,758	0	0	0.00 %	0.00 %
	Sawmills	85,758	5,020	5,020	5.85 %	100.00 %
88	Charlotte	82,834	874,579	82,834	100.00 %	9.47 %
89	Catawba	85,577	702	702	0.82 %	100.00 %
	Claremont	85,577	1,692	1,692	1.98 %	100.00 %
	Conover	85,577	8,421	424	0.50 %	5.04 %
	Hickory (Catawba)	85,577	43,379	0	0.00 %	0.00 %
	Maiden (Catawba)	85,577	3,736	3,736	4.37 %	100.00 %
	Newton	85,577	13,148	13,148	15.36 %	100.00 %
	Statesville	85,577	28,419	4	0.00 %	0.01 %
	Troutman	85,577	3,698	2,813	3.29 %	76.07 %
90	Dobson	82,937	1,462	1,462	1.76 %	100.00 %
	Elkin (Surry)	82,937	4,049	4,049	4.88 %	100.00 %
	Elkin (Wilkes)	82,937	73	73	0.09 %	100.00 %
	Mount Airy	82,937	10,676	10,676	12.87 %	100.00 %
	Pilot Mountain	82,937	1,440	1,440	1.74 %	100.00 %
	Ronda	82,937	438	438	0.53 %	100.00 %
91	Bethania	86,210	344	344	0.40 %	100.00 %
	Danbury	86,210	189	189	0.22 %	100.00 %
	King (Forsyth)	86,210	591	591	0.69 %	100.00 %
	King (Stokes)	86,210	6,606	6,606	7.66 %	100.00 %
	Rural Hall	86,210	3,351	3,351	3.89 %	100.00 %
	Tobaccoville (Forsyth)	86,210	2,578	1,754	2.03 %	68.04 %
	Tobaccoville (Stokes)	86,210	0	0	0.00 %	0.00 %
	Walnut Cove	86,210	1,586	1,586	1.84 %	100.00 %
	Winston-Salem	86,210	249,545	29,820	34.59 %	11.95 %
92	Charlotte	85,031	874,579	63,762	74.99 %	7.29 %
93	Beech Mountain (Watauga)	86,445	613	613	0.71 %	100.00 %
	Blowing Rock (Watauga)	86,445	1,285	1,280	1.48 %	99.61 %
	Boone	86,445	19,092	18,497	21.40 %	96.88 %
	Jefferson	86,445	1,622	1,622	1.88 %	100.00 %
	Lansing	86,445	126	126	0.15 %	100.00 %
	Seven Devils (Watauga)	86,445	275	275	0.32 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
93	Sparta	86,445	1,834	1,834	2.12 %	100.00 %
	West Jefferson	86,445	1,279	1,279	1.48 %	100.00 %
94	North Wilkesboro	90,835	4,382	4,382	4.82 %	100.00 %
	Taylorsville	90,835	2,320	2,320	2.55 %	100.00 %
	Wilkesboro	90,835	3,687	3,687	4.06 %	100.00 %
95	Davidson (Iredell)	85,366	378	378	0.44 %	100.00 %
	Mooresville	85,366	50,193	49,988	58.56 %	99.59 %
96	Brookford	89,587	442	442	0.49 %	100.00 %
	Conover	89,587	8,421	7,997	8.93 %	94.96 %
	Hickory (Catawba)	89,587	43,379	43,379	48.42 %	100.00 %
	Long View (Catawba)	89,587	4,353	4,353	4.86 %	100.00 %
	Newton	89,587	13,148	0	0.00 %	0.00 %
97	Lincolnton	86,810	11,091	11,091	12.78 %	100.00 %
	Maiden (Lincoln)	86,810	0	0	0.00 %	0.00 %
98	Cornelius	86,827	31,412	31,412	36.18 %	100.00 %
	Davidson (Mecklenburg)	86,827	14,728	14,728	16.96 %	100.00 %
	Huntersville	86,827	61,376	38,677	44.54 %	63.02 %
99	Charlotte	87,647	874,579	79,113	90.26 %	9.05 %
	Mint Hill (Mecklenburg)	87,647	26,444	0	0.00 %	0.00 %
100	Charlotte	87,197	874,579	87,197	100.00 %	9.97 %
101	Charlotte	86,426	874,579	64,526	74.66 %	7.38 %
	Huntersville	86,426	61,376	5,893	6.82 %	9.60 %
102	Charlotte	86,179	874,579	86,179	100.00 %	9.85 %
103	Charlotte	87,132	874,579	23,590	27.07 %	2.70 %
	Matthews	87,132	29,435	29,435	33.78 %	100.00 %
	Midland (Mecklenburg)	87,132	0	0	0.00 %	0.00 %
	Mint Hill (Mecklenburg)	87,132	26,444	26,444	30.35 %	100.00 %
	Stallings (Mecklenburg)	87,132	384	384	0.44 %	100.00 %
	Weddington (Mecklenburg)	87,132	5	5	0.01 %	100.00 %
104	Charlotte	86,520	874,579	86,520	100.00 %	9.89 %
105	Charlotte	85,822	874,579	71,156	82.91 %	8.14 %
	Pineville	85,822	10,602	10,602	12.35 %	100.00 %
106	Charlotte	82,824	874,579	79,717	96.25 %	9.11 %
107	Charlotte	88,237	874,579	67,298	76.27 %	7.69 %
	Huntersville	88,237	61,376	16,806	19.05 %	27.38 %
108	Belmont	86,263	15,010	1,868	2.17 %	12.45 %
	Cramerton	86,263	5,296	96	0.11 %	1.81 %
	Gastonia	86,263	80,411	28,480	33.02 %	35.42 %
	Lowell	86,263	3,654	3,654	4.24 %	100.00 %
	McAdenville	86,263	890	890	1.03 %	100.00 %
	Mount Holly	86,263	17,703	17,703	20.52 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
108	Ranlo	86,263	4,511	4,500	5.22 %	99.76 %
	Spencer Mountain	86,263	0	0	0.00 %	0.00 %
	Stanley	86,263	3,963	3,963	4.59 %	100.00 %
109	Belmont	87,762	15,010	13,142	14.97 %	87.55 %
	Cramerton	87,762	5,296	5,200	5.93 %	98.19 %
	Gastonia	87,762	80,411	44,448	50.65 %	55.28 %
	Lowell	87,762	3,654	0	0.00 %	0.00 %
110	Belwood	88,397	857	857	0.97 %	100.00 %
	Bessemer City	88,397	5,428	5,428	6.14 %	100.00 %
	Casar	88,397	305	305	0.35 %	100.00 %
	Cherryville	88,397	6,078	6,078	6.88 %	100.00 %
	Dallas	88,397	5,927	5,927	6.70 %	100.00 %
	Dellview	88,397	6	6	0.01 %	100.00 %
	Fallston	88,397	627	627	0.71 %	100.00 %
	Gastonia	88,397	80,411	7,483	8.47 %	9.31 %
	High Shoals	88,397	595	595	0.67 %	100.00 %
	Kings Mountain (Cleveland)	88,397	10,032	8	0.01 %	0.08 %
	Kings Mountain (Gaston)	88,397	1,110	1,110	1.26 %	100.00 %
	Kingstown	88,397	656	656	0.74 %	100.00 %
	Lawndale	88,397	570	570	0.64 %	100.00 %
	Polkville	88,397	516	516	0.58 %	100.00 %
	Ranlo	88,397	4,511	11	0.01 %	0.24 %
	Shelby	88,397	21,918	4,409	4.99 %	20.12 %
	Waco	88,397	310	310	0.35 %	100.00 %
111	Boiling Springs	89,894	4,615	4,615	5.13 %	100.00 %
	Bostic	89,894	355	355	0.39 %	100.00 %
	Earl	89,894	198	198	0.22 %	100.00 %
	Ellenboro	89,894	723	723	0.80 %	100.00 %
	Forest City	89,894	7,377	0	0.00 %	0.00 %
	Grover	89,894	802	802	0.89 %	100.00 %
	Kings Mountain (Cleveland)	89,894	10,032	10,024	11.15 %	99.92 %
	Lattimore	89,894	406	406	0.45 %	100.00 %
	Mooresboro	89,894	293	293	0.33 %	100.00 %
	Patterson Springs	89,894	571	571	0.64 %	100.00 %
	Shelby	89,894	21,918	17,509	19.48 %	79.88 %
112	Charlotte	82,806	874,579	82,687	99.86 %	9.45 %
	Pineville	82,806	10,602	0	0.00 %	0.00 %
113	Chimney Rock Village	89,058	140	140	0.16 %	100.00 %
	Columbus	89,058	1,060	1,060	1.19 %	100.00 %
	Flat Rock	89,058	3,486	3,486	3.91 %	100.00 %
	Forest City	89,058	7,377	7,377	8.28 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
113	Hendersonville	89,058	15,137	623	0.70 %	4.12 %
	Lake Lure	89,058	1,365	1,365	1.53 %	100.00 %
	Laurel Park	89,058	2,250	0	0.00 %	0.00 %
	Ruth	89,058	347	347	0.39 %	100.00 %
	Rutherfordton	89,058	3,640	3,640	4.09 %	100.00 %
	Saluda (Henderson)	89,058	11	11	0.01 %	100.00 %
	Saluda (Polk)	89,058	620	620	0.70 %	100.00 %
	Spindale	89,058	4,225	4,225	4.74 %	100.00 %
	Tryon	89,058	1,562	1,562	1.75 %	100.00 %
114	Asheville	89,685	94,589	52,596	58.65 %	55.60 %
	Weaverville	89,685	4,567	4,567	5.09 %	100.00 %
	Woodfin	89,685	7,936	7,648	8.53 %	96.37 %
115	Asheville	90,262	94,589	29,236	32.39 %	30.91 %
	Black Mountain	90,262	8,426	8,426	9.34 %	100.00 %
	Montreat	90,262	901	901	1.00 %	100.00 %
116	Asheville	89,505	94,589	12,757	14.25 %	13.49 %
	Biltmore Forest	89,505	1,409	1,409	1.57 %	100.00 %
	Woodfin	89,505	7,936	288	0.32 %	3.63 %
117	Fletcher	91,035	7,987	7,987	8.77 %	100.00 %
	Hendersonville	91,035	15,137	14,514	15.94 %	95.88 %
	Laurel Park	91,035	2,250	2,250	2.47 %	100.00 %
	Mills River	91,035	7,078	7,078	7.78 %	100.00 %
118	Canton	83,282	4,422	4,422	5.31 %	100.00 %
	Clyde	83,282	1,368	1,368	1.64 %	100.00 %
	Hot Springs	83,282	520	520	0.62 %	100.00 %
	Maggie Valley	83,282	1,687	1,687	2.03 %	100.00 %
	Mars Hill	83,282	2,007	2,007	2.41 %	100.00 %
	Marshall	83,282	777	777	0.93 %	100.00 %
	Waynesville	83,282	10,140	10,140	12.18 %	100.00 %
119	Brevard	90,212	7,744	7,744	8.58 %	100.00 %
	Bryson City	90,212	1,558	1,558	1.73 %	100.00 %
	Dillsboro	90,212	213	213	0.24 %	100.00 %
	Forest Hills	90,212	303	303	0.34 %	100.00 %
	Highlands (Jackson)	90,212	12	12	0.01 %	100.00 %
	Rosman	90,212	701	701	0.78 %	100.00 %
	Sylva	90,212	2,578	2,578	2.86 %	100.00 %
	Webster	90,212	372	372	0.41 %	100.00 %
120	Andrews	84,907	1,667	1,667	1.96 %	100.00 %
	Fontana Dam	84,907	13	13	0.02 %	100.00 %
	Franklin	84,907	4,175	4,175	4.92 %	100.00 %
	Hayesville	84,907	461	461	0.54 %	100.00 %

District - Municipality by County Report

District Plan: SL 2021-175 House

District	Municipality	Total District Population	Total Muni Population	District Pop in Muni	Percent of District Pop in Muni	Percent of Muni Pop in District
120	Highlands (Macon)	84,907	1,060	1,060	1.25 %	100.00 %
	Lake Santeetlah	84,907	38	38	0.04 %	100.00 %
	Murphy	84,907	1,608	1,608	1.89 %	100.00 %
	Robbinsville	84,907	597	597	0.70 %	100.00 %
			Total:	**6,017,605**		

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
1	Chowan	6	0
	Currituck	11	0
	Dare	3	1
	Perquimans	7	0
	Tyrrell	6	0
	Washington	6	0
2	Durham	8	2
	Person	11	0
3	Craven	19	1
4	Duplin	19	0
	Wayne	7	1
5	Camden	3	0
	Gates	6	0
	Hertford	13	0
	Pasquotank	9	0
6	Harnett	6	0
7	Franklin	18	0
	Granville	2	0
8	Pitt	21	0
9	Pitt	19	0
10	Wayne	20	1
11	Wake	19	0
12	Greene	10	0
	Jones	7	0
	Lenoir	22	0
13	Carteret	28	0
	Craven	1	1
14	Onslow	10	0
15	Onslow	9	0
16	Onslow	5	0
	Pender	20	0
17	Brunswick	14	0
18	New Hanover	19	0
19	Brunswick	11	0
	New Hanover	7	0
20	New Hanover	17	0
21	Wake	16	0
22	Bladen	17	0
	Sampson	23	0
23	Bertie	12	0
	Edgecombe	21	0
	Martin	13	0

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
24	Nash	2	0
	Wilson	24	0
25	Nash	22	0
26	Johnston	12	0
27	Halifax	23	0
	Northampton	13	0
	Warren	14	0
28	Johnston	18	0
29	Durham	21	1
30	Durham	17	1
31	Durham	8	2
32	Granville	13	0
	Vance	12	0
33	Wake	19	0
34	Wake	24	0
35	Wake	14	0
36	Wake	12	0
37	Wake	12	0
38	Wake	13	0
39	Wake	14	0
40	Wake	20	0
41	Wake	11	0
42	Cumberland	13	0
43	Cumberland	28	0
44	Cumberland	19	0
45	Cumberland	16	0
46	Columbus	26	0
	Robeson	14	0
47	Robeson	25	0
48	Hoke	15	0
	Scotland	7	0
49	Wake	15	0
50	Caswell	9	0
	Orange	18	0
51	Lee	10	0
	Moore	4	0
52	Moore	10	0
	Richmond	16	0
53	Harnett	7	0
	Johnston	6	0
54	Chatham	18	0
	Randolph	2	0

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
55	Anson	9	0
	Union	17	0
56	Orange	23	0
57	Guilford	27	0
58	Guilford	24	0
59	Guilford	24	0
60	Guilford	27	0
61	Guilford	34	0
62	Guilford	29	0
63	Alamance	19	0
64	Alamance	18	0
65	Rockingham	15	0
66	Wake	15	0
67	Montgomery	14	0
	Stanly	22	0
68	Union	16	0
69	Union	19	0
70	Randolph	12	0
71	Forsyth	20	0
72	Forsyth	32	0
73	Cabarrus	15	0
74	Forsyth	19	0
75	Forsyth	19	0
76	Rowan	25	0
77	Davie	14	0
	Rowan	5	0
	Yadkin	12	0
78	Moore	12	0
	Randolph	8	0
79	Beaufort	21	0
	Dare	12	1
	Hyde	7	0
	Pamlico	10	0
80	Davidson	22	0
81	Davidson	21	0
82	Cabarrus	20	0
83	Cabarrus	5	0
	Rowan	11	0
84	Iredell	19	0
85	Avery	19	0
	McDowell	15	0
	Mitchell	9	0
	Yancey	11	0

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
86	Burke	33	0
87	Caldwell	20	0
	Watauga	2	0
88	Mecklenburg	18	0
89	Catawba	17	0
	Iredell	2	0
90	Surry	24	0
	Wilkes	6	0
91	Forsyth	11	0
	Stokes	18	0
92	Mecklenburg	9	0
93	Alleghany	4	0
	Ashe	17	0
	Watauga	18	0
94	Alexander	10	0
	Wilkes	21	0
95	Iredell	8	0
96	Catawba	23	0
97	Lincoln	23	0
98	Mecklenburg	10	1
99	Mecklenburg	15	0
100	Mecklenburg	21	0
101	Mecklenburg	10	0
102	Mecklenburg	19	0
103	Mecklenburg	16	0
104	Mecklenburg	26	0
105	Mecklenburg	12	0
106	Mecklenburg	10	0
107	Mecklenburg	11	1
108	Gaston	20	0
109	Gaston	14	0
110	Cleveland	10	0
	Gaston	12	0
111	Cleveland	11	0
	Rutherford	6	0
112	Mecklenburg	17	0
113	Henderson	8	0
	McDowell	2	0
	Polk	7	0
	Rutherford	11	0
114	Buncombe	29	0
115	Buncombe	32	0
116	Buncombe	18	0

Whole-Split VTD Counts by District Report

District Plan: SL 2021-175 House

District	County	Whole VTDs	Split VTDs
117	Henderson	26	0
118	Haywood	29	0
	Madison	12	0
119	Jackson	13	0
	Swain	5	0
	Transylvania	15	0
120	Cherokee	16	0
	Clay	9	0
	Graham	4	0
	Macon	15	0
	Total:	**2,659**	**7**

Whole-Split VTD Counts by County Report

District Plan: SL 2021-175 House

County	Whole VTDs	Split VTDs
Alamance	37	0
Alexander	10	0
Alleghany	4	0
Anson	9	0
Ashe	17	0
Avery	19	0
Beaufort	21	0
Bertie	12	0
Bladen	17	0
Brunswick	25	0
Buncombe	79	0
Burke	33	0
Cabarrus	40	0
Caldwell	20	0
Camden	3	0
Carteret	28	0
Caswell	9	0
Catawba	40	0
Chatham	18	0
Cherokee	16	0
Chowan	6	0
Clay	9	0
Cleveland	21	0
Columbus	26	0
Craven	20	1
Cumberland	76	0
Currituck	11	0
Dare	15	1
Davidson	43	0
Davie	14	0
Duplin	19	0
Durham	54	3
Edgecombe	21	0
Forsyth	101	0
Franklin	18	0
Gaston	46	0
Gates	6	0
Graham	4	0
Granville	15	0
Greene	10	0
Guilford	165	0
Halifax	23	0
Harnett	13	0

Whole-Split VTD Counts by County Report

District Plan: SL 2021-175 House

County	Whole VTDs	Split VTDs
Haywood	29	0
Henderson	34	0
Hertford	13	0
Hoke	15	0
Hyde	7	0
Iredell	29	0
Jackson	13	0
Johnston	36	0
Jones	7	0
Lee	10	0
Lenoir	22	0
Lincoln	23	0
Macon	15	0
Madison	12	0
Martin	13	0
McDowell	17	0
Mecklenburg	194	1
Mitchell	9	0
Montgomery	14	0
Moore	26	0
Nash	24	0
New Hanover	43	0
Northampton	13	0
Onslow	24	0
Orange	41	0
Pamlico	10	0
Pasquotank	9	0
Pender	20	0
Perquimans	7	0
Person	11	0
Pitt	40	0
Polk	7	0
Randolph	22	0
Richmond	16	0
Robeson	39	0
Rockingham	15	0
Rowan	41	0
Rutherford	17	0
Sampson	23	0
Scotland	7	0
Stanly	22	0
Stokes	18	0
Surry	24	0

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Based on TIGER 2020 VTDs
[G20-VTD-SbC] - Generated 11/4/2021

Whole-Split VTD Counts by County Report

District Plan: SL 2021-175 House

County	Whole VTDs	Split VTDs
Swain	5	0
Transylvania	15	0
Tyrrell	6	0
Union	52	0
Vance	12	0
Wake	204	0
Warren	14	0
Washington	6	0
Watauga	20	0
Wayne	27	1
Wilkes	27	0
Wilson	24	0
Yadkin	12	0
Yancey	11	0
Totals:	**2,659**	**7**

Split VTD Detail Report

District Plan: SL 2021-175 House

County	VTD	District	Total VTD Population	VTD Pop in District	Percent of VTD Pop in District
Craven	002	3	18,203	6,483	35.62 %
		13	18,203	11,720	64.38 %
Dare	KDH	1	7,656	7,118	92.97 %
		79	7,656	538	7.03 %
Durham	014	29	4,535	4,232	93.32 %
		31	4,535	303	6.68 %
	023	2	10,357	1,533	14.80 %
		30	10,357	8,824	85.20 %
	30-2	2	10,654	958	8.99 %
		31	10,654	9,696	91.01 %
Mecklenburg	134	98	11,104	4,537	40.86 %
		107	11,104	6,567	59.14 %
Wayne	016	4	3,810	992	26.04 %
		10	3,810	2,818	73.96 %
			Total:	**66,319**	

Number of split VTDs: 7

Incumbent-District Report

District Plan: SL 2021-175 House
Residence Set: NC House - 10/01/2021

Last Name	First Name	Party	Current District	District in this Plan
Adams	James	Republican	96	96
Adcock	Gale	Democratic	41	41
Ager	John	Democratic	115	115
Alexander	Kelly	Democratic	107	107
Alston	Vernetta	Democratic	29	29
Arp	Larry	Republican	69	69
Autry	Johnnie	Democratic	100	100
Baker	Amber	Democratic	72	72
Baker	Kristin	Republican	82	82
Ball	Cynthia	Democratic	49	49
Belk	Mary	Democratic	88	88
Bell	John	Republican	10	10
Blackwell	Hugh	Republican	86	86
Boles	James	Republican	52	52
Bradford	John	Republican	98	98
Brisson	William	Republican	22	22
Brockman	Cecil	Democratic	60	60
Brody	Mark	Republican	55	55
Brown	Terry	Democratic	92	92
Bumgardner	Dana	Republican	109	109
Butler	Deborah	Democratic	18	18
Carney	Becky	Democratic	102	102
Clampitt	James	Republican	119	119
Clemmons	Ashton	Democratic	57	57
Cleveland	George	Republican	14	14
Cooper-Suggs	Linda	Democratic	24	24
Cunningham	Carla	Democratic	106	106
Dahle	Allison	Democratic	11	11
Davis	Robert	Republican	20	20
Dixon	James	Republican	4	4
Elmore	Jeffrey	Republican	94	94
Everitt	Terence	Democratic	35	35
Faircloth	Joseph	Republican	62	62
Farkas	Brian	Democratic	9	9
Fisher	Susan	Democratic	114	114
Gailliard	James	Democratic	25	25
Garrison	Terry	Democratic	32	32
Gill	Rosa	Democratic	33	33
Gillespie	Karl	Republican	120	120
Goodwin	Edward	Republican	1	1
Graham	Charles	Democratic	47	47
Greene	Edwin	Republican	85	85

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Row shading indicates that the district in this plan is shared by more than one incumbent.
[G20-IncDist] - Generated 11/4/2021

Incumbent-District Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

Last Name	First Name	Party	Current District	District in this Plan
Hall	Destin	Republican	87	87
Hall	Kyle	Republican	91	91
Hanig	Robert	Republican	6	1
Hardister	Jonathan	Republican	59	59
Harris	Wesley	Democratic	105	105
Harrison	Mary	Democratic	61	61
Hastings	Kelly	Republican	110	110
Hawkins	Zack	Democratic	31	31
Howard	Julia	Republican	77	77
Humphrey	Thomas	Republican	12	12
Hunt	Rachel	Democratic	103	103
Hunter	Howard	Democratic	5	5
Hurley	Patricia	Republican	70	70
Hurtado	Ricardo	Democratic	63	63
Iler	Francis	Republican	17	17
Insko	Verla	Democratic	56	56
John	Joseph	Democratic	40	40
Johnson	Jake	Republican	113	113
Jones	Abraham	Democratic	38	38
Jones	Brenden	Republican	46	46
Kidwell	Keith	Republican	79	79
Lambeth	Donny	Republican	75	75
Lofton	Brandon	Democratic	104	104
Logan	Carolyn	Democratic	101	101
Lucas	Marvin	Democratic	42	42
Majeed	Nasif	Democratic	99	99
Martin	David	Democratic	34	34
McElraft	Patricia	Republican	13	13
McNeely	Jeffrey	Republican	84	84
McNeill	Allen	Republican	78	78
Meyer	Graig	Democratic	50	50
Miller	Charles	Republican	19	19
Mills	Paul	Republican	95	95
Moffitt	Timothy	Republican	117	117
Moore	Timothy	Republican	111	111
Morey	Marcia	Democratic	30	30
Moss	Ben	Republican	66	52
Paré	Erin	Republican	37	37
Penny	Howard	Republican	53	53
Pickett	Phillip	Republican	93	93
Pierce	Garland	Democratic	48	48
Pittman	Larry	Republican	83	82

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Row shading indicates that the district in this plan is shared by more than one incumbent.
[G20-IncDist] - Generated 11/4/2021

Incumbent-District Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

Last Name	First Name	Party	Current District	District in this Plan
Pless	Steven	Republican	118	118
Potts	Larry	Republican	81	81
Pyrtle	Armor	Republican	65	65
Quick	Amos	Democratic	58	58
Reives	Robert	Democratic	54	54
Richardson	William	Democratic	44	44
Riddell	Dennis	Republican	64	64
Roberson	James	Democratic	39	39
Rogers	David	Republican	112	113
Saine	Jason	Republican	97	97
Sasser	Clayton	Republican	67	67
Sauls	John	Republican	51	51
Setzer	Mitchell	Republican	89	89
Shepard	Phillip	Republican	15	15
Smith	Carson	Republican	16	16
Smith	Kandie	Democratic	8	8
Smith	Raymond	Democratic	21	10
Stevens	Sarah	Republican	90	90
Strickland	Larry	Republican	28	28
Szoka	John	Republican	45	45
Terry	Evelyn	Democratic	71	71
Torbett	John	Republican	108	108
Turner	Brian	Democratic	116	116
Tyson	John	Republican	3	3
von Haefen	Julie	Democratic	36	36
Warren	Harry	Republican	76	76
Watford	Samuel	Republican	80	80
Wheatley	Diane	Republican	43	43
White	Donna	Republican	26	26
Willingham	Shelly	Democratic	23	23
Willis	David	Republican	68	68
Winslow	Matthew	Republican	7	7
Wray	Michael	Democratic	27	27
Yarborough	Lawrence	Republican	2	2
Zachary	Walter	Republican	73	77
Zenger	Jeffrey	Republican	74	74

District plan definition file: 'SL 2021-175 House.csv', modified 11/4/2021 3:01 PM
Row shading indicates that the district in this plan is shared by more than one incumbent.
[G20-IncDist] - Generated 11/4/2021

District-Incumbent Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

District in this Plan	Last Name	First Name	Party	Current District
1	Goodwin	Edward	Republican	1
	Hanig	Robert	Republican	6
2	Yarborough	Lawrence	Republican	2
3	Tyson	John	Republican	3
4	Dixon	James	Republican	4
5	Hunter	Howard	Democratic	5
6				
7	Winslow	Matthew	Republican	7
8	Smith	Kandie	Democratic	8
9	Farkas	Brian	Democratic	9
10	Bell	John	Republican	10
	Smith	Raymond	Democratic	21
11	Dahle	Allison	Democratic	11
12	Humphrey	Thomas	Republican	12
13	McElraft	Patricia	Republican	13
14	Cleveland	George	Republican	14
15	Shepard	Phillip	Republican	15
16	Smith	Carson	Republican	16
17	Iler	Francis	Republican	17
18	Butler	Deborah	Democratic	18
19	Miller	Charles	Republican	19
20	Davis	Robert	Republican	20
21				
22	Brisson	William	Republican	22
23	Willingham	Shelly	Democratic	23
24	Cooper-Suggs	Linda	Democratic	24
25	Gailliard	James	Democratic	25
26	White	Donna	Republican	26
27	Wray	Michael	Democratic	27
28	Strickland	Larry	Republican	28
29	Alston	Vernetta	Democratic	29
30	Morey	Marcia	Democratic	30
31	Hawkins	Zack	Democratic	31
32	Garrison	Terry	Democratic	32
33	Gill	Rosa	Democratic	33
34	Martin	David	Democratic	34
35	Everitt	Terence	Democratic	35
36	von Haefen	Julie	Democratic	36
37	Paré	Erin	Republican	37
38	Jones	Abraham	Democratic	38
39	Roberson	James	Democratic	39
40	John	Joseph	Democratic	40
41	Adcock	Gale	Democratic	41

District-Incumbent Report

District Plan: SL 2021-175 House
Residence Set: NC House - 10/01/2021

District in this Plan	Last Name	First Name	Party	Current District
42	Lucas	Marvin	Democratic	42
43	Wheatley	Diane	Republican	43
44	Richardson	William	Democratic	44
45	Szoka	John	Republican	45
46	Jones	Brenden	Republican	46
47	Graham	Charles	Democratic	47
48	Pierce	Garland	Democratic	48
49	Ball	Cynthia	Democratic	49
50	Meyer	Graig	Democratic	50
51	Sauls	John	Republican	51
52	Boles	James	Republican	52
	Moss	Ben	Republican	66
53	Penny	Howard	Republican	53
54	Reives	Robert	Democratic	54
55	Brody	Mark	Republican	55
56	Insko	Verla	Democratic	56
57	Clemmons	Ashton	Democratic	57
58	Quick	Amos	Democratic	58
59	Hardister	Jonathan	Republican	59
60	Brockman	Cecil	Democratic	60
61	Harrison	Mary	Democratic	61
62	Faircloth	Joseph	Republican	62
63	Hurtado	Ricardo	Democratic	63
64	Riddell	Dennis	Republican	64
65	Pyrtle	Armor	Republican	65
66				
67	Sasser	Clayton	Republican	67
68	Willis	David	Republican	68
69	Arp	Larry	Republican	69
70	Hurley	Patricia	Republican	70
71	Terry	Evelyn	Democratic	71
72	Baker	Amber	Democratic	72
73				
74	Zenger	Jeffrey	Republican	74
75	Lambeth	Donny	Republican	75
76	Warren	Harry	Republican	76
77	Howard	Julia	Republican	77
	Zachary	Walter	Republican	73
78	McNeill	Allen	Republican	78
79	Kidwell	Keith	Republican	79
80	Watford	Samuel	Republican	80
81	Potts	Larry	Republican	81

District-Incumbent Report

District Plan: SL 2021-175 House

Residence Set: NC House - 10/01/2021

District in this Plan	Last Name	First Name	Party	Current District
82	Baker	Kristin	Republican	82
	Pittman	Larry	Republican	83
83				
84	McNeely	Jeffrey	Republican	84
85	Greene	Edwin	Republican	85
86	Blackwell	Hugh	Republican	86
87	Hall	Destin	Republican	87
88	Belk	Mary	Democratic	88
89	Setzer	Mitchell	Republican	89
90	Stevens	Sarah	Republican	90
91	Hall	Kyle	Republican	91
92	Brown	Terry	Democratic	92
93	Pickett	Phillip	Republican	93
94	Elmore	Jeffrey	Republican	94
95	Mills	Paul	Republican	95
96	Adams	James	Republican	96
97	Saine	Jason	Republican	97
98	Bradford	John	Republican	98
99	Majeed	Nasif	Democratic	99
100	Autry	Johnnie	Democratic	100
101	Logan	Carolyn	Democratic	101
102	Carney	Becky	Democratic	102
103	Hunt	Rachel	Democratic	103
104	Lofton	Brandon	Democratic	104
105	Harris	Wesley	Democratic	105
106	Cunningham	Carla	Democratic	106
107	Alexander	Kelly	Democratic	107
108	Torbett	John	Republican	108
109	Bumgardner	Dana	Republican	109
110	Hastings	Kelly	Republican	110
111	Moore	Timothy	Republican	111
112				
113	Johnson	Jake	Republican	113
	Rogers	David	Republican	112
114	Fisher	Susan	Democratic	114
115	Ager	John	Democratic	115
116	Turner	Brian	Democratic	116
117	Moffitt	Timothy	Republican	117
118	Pless	Steven	Republican	118
119	Clampitt	James	Republican	119
120	Gillespie	Karl	Republican	120

NCLCV v. Hall
21 CVS 15426
LDTX198

Exhibit #
Mattingly 5
12/31/21 - MS
exhibitsticker.com

Addendum to Primary Expert Report of Jonathan C. Mattingly, Ph.D.

I am a Professor of Mathematics and Statistical Science at Duke University. My degrees are from the North Carolina School of Science and Math (High School Diploma), Yale University (B.S.), and Princeton University (Ph.D.). I grew up in Charlotte, North Carolina and currently live in Durham, North Carolina.

I lead a group at Duke University which conducts non-partisan research to understand and quantify gerrymandering. This report grows out of aspects of our group's work around the current North Carolina legislative districts which are relevant to the case being filed.

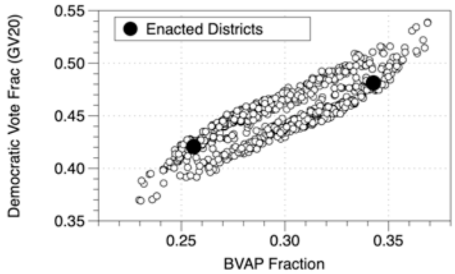
I previously submitted an expert report in Common Cause v. Rucho, No. 18-CV-1026 (M.D.N.C.), Diamond v. Torres, No. 17-CV-5054 (E.D. Pa.), Common Cause v. Lewis (N.C. Sup. Ct No. 18-cvs-014001), and Harper v. Lewis (No. 19-cv-012667) and was an expert witness for the plaintiffs in Common Cause v. Rucho and Common Cause v. Lewis. I am being paid at a rate of $400/per hour for the work on this case. This note is a companion to the main expert report. It has been requested by a subset of plaintiffs' counsel.

Addendum Analysis

We examine the correlation between the fraction of the black voting age population and the partisan make up of (i) the North Eastern cluster choices in the North Carolina State Senate, and (ii) the districts within the Duplin-Wayne county cluster in the North Carolina State House.

North Eastern Cluster Options

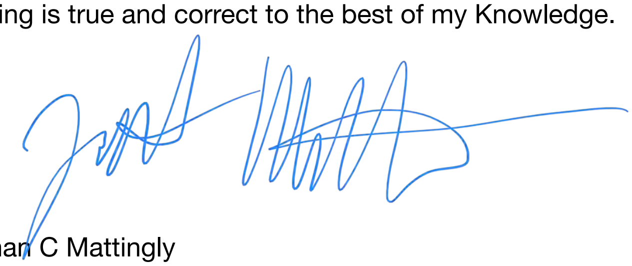
	Enacted Clusters		Alternative Option	
County Clusters (1 district per cluster)	**MARTIN WARREN HALIFAX HYDE PAMLICO CHOWAN WASHINGTON CARTERET**	**GATES CURRITUCK PASQUOTANK DARE BERTIE CAMDEN PERQUIMANS HERTFORD TYRRELL NORTHAMPTON**	**PASQUOTANK DARE PERQUIMANS HYDE PAMLICO CHOWAN WASHINGTON CARTERET**	**GATES CURRITUCK CAMDEN BERTIE WARREN HALIFAX HERTFORD TYRRELL NORTHAMPTON MARTIN**
BVAP(%)	30.0%	29.49%	17.47%	42.33%
Dem Vote % (LG16)	46.07%	47.74%	38.51%	55.42%
Dem Vote %(PR16)	45.60%	46.70%	37.83%	54.59%
Dem Vote %(CA20)	42.28%	44.47%	36.48%	50.75%
Dem Vote %(USS20)	45.31%	45.36%	38.45%	52.75%
Dem Vote %(TR20)	44.12%	44.58%	37.61%	51.59%
Dem Vote %(GV20)	46.79%	47.56%	40.75%	54.12%
Dem Vote %(AD20)	47.79%	47.72%	41.02%	54.99%
Dem Vote %(SST20)	47.56%	47.85%	41.03%	54.89%
Dem Vote %(AG20)	45.88%	46.11%	39.15%	53.40%
Dem Vote %(PR20)	44.09%	45.54%	38.30%	51.84%
Dem Vote %(LG20)	43.80%	45.12%	37.74%	51.69%
Dem Vote %(CL20)	45.23%	46.42%	39.12%	52.00%



The Northeastern corner of the North Carolina State Senate has two possible county clusterings; each clustering is made of two clusters each with one district. We compare the enacted plan with the other possible districting option. We find that the enacted plan splits the Black voters roughly in half, whereas the other potential clustering would have concentrated Black voters in one of the two resulting districts. Furthermore, we find that the enacted plan leads to two stable Republican districts when measured across a range of historic voting patterns. In contrast, the alternative clustering would have allowed the district with the larger BVAP (42.33% BVAP) to reliably elect a Democratic candidate. Thus, the chosen cluster is the choice that favors the Republican party andsignificantly fractures Black voters in the area.

Next, we examine the correlation between BVAP fraction and Democratic vote fraction in the Duplin-Wayne cluster. We elect to use the 2020 Governor votes and plot the relationship between the BVAP and the vote fraction in (i) our ensemble and (ii) the enacted plan. We demonstrate that (i) it is possible to draw districts with significantly higher BVAPs and that (ii) according to the examined historic votes, raising the BVAP would likely raise the Democratic vote fraction.

I declare under penalty of perjury under the laws of the state of North Carolina that the foregoing is true and correct to the best of my Knowledge.



Jonathan C Mattingly
Dec 23, 2021.

NCLCV v. Hall
21 CVS 15426
LDTX199

Exhibit #
Mattingly 6
12/31/21 - MS
exhibitsticker.com

Response to Expert Report by Dr. Barber on the North Carolina State Legislature Redistricting Plans

Jonathan C. Mattingly

December 28, 2021

Contents

1 Introduction

The report by Dr. Michael Barber begins with a discussion of the political geography of the state of North Carolina. He emphasizes the heterogeneity of the state. While he points out the strengths of ensemble methods to separate the effect of natural clustering of votes and other effects due to political geography, Dr. Barber limits its use to analysis of the individual county clusters. Similarly, though he uses a collection of election data at the cluster level, he does not consider a diverse collection of election analyses both at the cluster level and when performing his statewide analysis. Rather, he restricts himself to a single summary statistic, namely, counting the number of Democratic-leaning districts at the individual cluster level based primarily on a composite election obtained through averaging several past statewide elections.

We complete the missing parts of Dr. Barber's analysis using data directly from his report when possible. When needed, we augment this data with an ensemble of maps obtained by running Dr. Barber's code. From this completed analysis, we see that Dr. Barber's ensemble shows both the Enacted NC House and the Enacted NC Senate to be extreme partisan outliers with a clear and systematic tilt in favor of electing Republicans.

When we focus on the structure of the enacted maps in the county clusters under Dr. Barber's analysis, we again see the same structures we observed using the Primary Ensembles from our initial report. These structures showed the enacted map to be an extreme outlier. Due to time constraints, we did not complete cluster level analysis on all clusters using Dr. Barber's simulations; we have, however, performed a cluster level analysis on a diverse collection of clusters in the NC House. Our cluster level analysis considers not only seat counts, but also the margins of victory within those seats. By examining the margins, we identify extreme partisan behavior at the cluster level using the very sampling code that Dr. Barber created.

We conclude that Dr. Barber's ensembles provide another independent verification that the enacted plans for the NC House and NC Senate are extreme gerrymanders.

2 Comment on Political Geography of State

In Section 3 of Dr. Barber's report, he discusses the political geography of the state. He made a number of statewide evaluations of the partisan structure using a single average of 11 statewide elections from 2014-2020. As his analysis in later sections makes clear, the political climate varies significantly from year to year and election to election. The average of these elections creates a new set of voting data, possibly quite district from those averaged to create it. I see no reason to elevate the behavior and properties of a map under the one particular political environment signified by this vote over other elections. It is important that the map used to translate our election votes into elected officials act in a non-biased way across a number of elections which represent different political climates seen in North Carolina, not just one.

In the rest of the report, Dr. Barber does switch to considering a number of distinct elections. However, he does not return to any aggregate statewide discussion using these individual elections and the diversity of election environments they represent. He does firmly endorse the use of a computer drawn ensemble of maps to create a base line against which the enacted map can be compared. He correctly represents that this method has the advantage of taking into account all of the political geography of the state, such as the concentrating of particular voters in some regions of the state or the preservation of counties and the like. Hence, when a map is an outlier compared to a computer drawn ensemble, these natural clustering or political geography considerations cannot be the explanation.

Dr. Barber never conducts any statewide analysis under his ensemble using different election results. However, all of the components necessary to perform such analysis are present in his report. Utilizing Dr. Barber's cluster-by-cluster ensembles, we complete the absent statewide analysis to examine the number of Democratic leaning seats under various elections. This analysis demonstrates that the enacted map *is* an extreme outlier when compared to Dr. Barber's ensemble.

3 Nonpartisan Ensemble Generated by Dr. Barber

In analyzing the North Carolina State House and Senate maps, Dr. Michael Barber generates an ensemble of non-partisan redistricting maps via the Sequential Monte Carlo (SMC) procedure in the *redist* R-package developed and maintained by a research group at Harvard University. When used to sample from a known distribution in a moderate sized problem, this method has been shown to faithfully sample the target distribution. This was validated on moderate sized examples using an enumeration algorithm developed by the same group that developed the *redist* R-package at Harvard. The method we used has similarly been validated using this and other methods. Dr. Barber used the ensemble method only at the cluster level and does not use it to perform a statewide analysis based on a statewide ensemble. Rather he just summarizes the cluster by cluster results in a few tables (Table 2 and Table 32) instead of performing any analysis which would show the cumulative effect at the statewide level. The coin flipping analogy we offer below shows why this is so inadequate. In utilizing Dr. Barber's ensemble, we demonstrate that he would have concluded the enacted map was an extreme outlier at the statewide level. This is not an endorsement of any of the particular algorithm choices he has made, but rather to demonstrate that this conclusion is available from his findings.

By taking the percentages in the cluster-by-cluster tables in Dr. Barber's report, we were able to perform the statewide analysis he neglected using his data. We were also able to perform this for the collection of different statewide elections Dr. Barber used in his analysis. This allowed us to see the behavior of the maps under different types of elections. Both of these considerations are important and we briefly discuss them individually before turning to the statewide analysis using Dr. Barber's data.

- **Importance of statewide analysis:** Dr. Barber analyzes each cluster one-by-one and concludes that the majority of them are not extreme outliers so under his election composite the map is not an outlier. However, in almost every case, he finds that the more Republican of the non-outlying options is selected. Consider the following analogy. Someone flips a coin that they claim is fair but is in fact biased to produce heads more often. They flip the coin and produce 40 heads and zero tails. On each flip, the chance of getting a head from a fair coin is 50%. Hence the outcome on each flip is not that surprising. Dr. Barber's analysis is analogous to looking at each flip alone and then claiming that the coin is fair because the outcome was a head and the chance of a fair coin producing a head was reasonable. However, taking a more global view one can an easily see that the chance of getting 40 heads in a row is astronomically small. And thus, one can conclude the coin is biased. This would even be true if there were only 35 heads and 5 tails.

  Analogously, each cluster taken individually might not be an extreme outlier, but it is extremely unlikely that all of these clusters woud exist together in a statewide map drawn without partisan intent.

  We will also see that some of the local clusters are extreme outliers in their own right using Dr. Barber's data and extending his analysis to look at the margins of victory (or the extent of the partisan lean) rather than only focusing on the number of seats won by either party (or the direction of the partisan lean). This extended analysis agrees with the finding in our initial report.

- **Often extreme behavior is apparent in only some elections:** If one wanted to rig a card game by colluding with some of the other players, the group would only need to act when none of the group was going to win. The group need only act when cards were aligned against them. Hence, the behavior of a gerrymandered map might appear typical in settings where the gerrymandering party is content with the outcome that one would typically expect without gerrymandering. Furthermore, it is possible that whatever system the card players are using is not sufficient to counteract some hands. In other words, even a card player that is cheating might not be able to win when their opponent draws a royal flush. Hence, it is not to be expected that in all cases a gerrymandered map is effective in supporting the gerrymandering party.

  In particular, one can not simply declare that a map is not gerrymandered because it is fair in some fraction (even a relatively large fraction) of the election environments. If it is clearly gerrymandered in some reasonable and pertinent election environments, then the map should be seen as gerrymandered. To do otherwise would be to argue that a casino would be happy with card players who only cheated 30% of the time and in particular did not cheat when they were already winning or had an unsalvageable hand.

In addition to generating a statewide analysis using the actual data from Dr. Barber's report, we also employ ensembles generated from the *redist* code base, set up according to Dr. Barber's analysis scripts.[1] We then show that well-established methods of probing for gerrymandering reveal that many of the individual clusters are indeed extreme gerrymanders. In doing so, we consider the partisan seat counts of each party and also extend the analysis to consider *how* the seats are won. The latter is important as it shows the degree that a given district is politically safe as well as determines how future political swings, unseen at present, might affect political outcomes. For example, atypically polarized districts can lead to maps which do not respond to the shifts in the electorate's preferences, and effectively lock in a particular outcome. Additionally, when a map has an extremely partisan structure, this can speak to the intent of the map makers even if the structure would be unlikely to affect some collection of elections such as wave elections in favor of the gerrymandering party.

[1] Dr. Barber did include a R Data file which might have included the maps he generated in his run. However, since our version of R was slightly different than his, it would not load. Hence we were forced to re-run his code.

4 Statewide Analysis of Dr. Barber's Ensemble of NC House Plans

Within each cluster, Dr. Barber presents the fraction of plans in his ensembles that would lead to a certain number of Democratic districts under each set of historic and averaged vote counts. These tables can be used to construct the probability of drawing a non-partisan plan at the statewide level that would yield a certain number of Democratic leaning districts under various elections.

Beginning with his averaged statewide vote counts, we construct the statewide probabilities of electing various numbers of representatives and present them in Figure 1 in terms of the number of Democrats elected. Only 0.177% of all of the plans in Dr. Barber's ensemble elect the same or more Republicans than the enacted plan.

Note that our count of Democrats elected includes the Democrats elected in single-district clusters, which are omitted from Dr. Barber's Table 2. So our Figure 1 reports that the enacted plan elects 49 Democrats under Dr. Barber's composite of elections, which is the four Democrats elected in single-district clusters that Dr. Barber reports in his Table 1 plus the 45 Democrats elected in multi-district clusters that Dr. Barber reports in his Table 2.

We repeat the above analysis with the 2016 and 2020 election data used by Dr. Barber. The only supplemental data we introduce is the number of single district Democratic clusters in each election which we have taken from our previous analysis. We summarize the 10 elections in Figure 2 and Table 1.

As in our previous analysis, we find that the outlier status of the ensemble has a significant impact on the amount of power the Republicans can amass in the House. For example, under the votes of the 2020 Lt. Governor race, 2016 Presidential race, and 2020 US Senate race, the ensemble breaks a Republican supermajority in 99.3937%, 98.976, and 99.992% of the plans in Dr. Barber's ensemble, respectively. However, the enacted plan would elect a Republican supermajority under each of these votes. Similarly, under the 2020 Governor race, the Republican majority would have been broken in 96.42% of the plans in Dr Barber's ensemble, yet they would have maintained the majority using the enacted map under these votes.

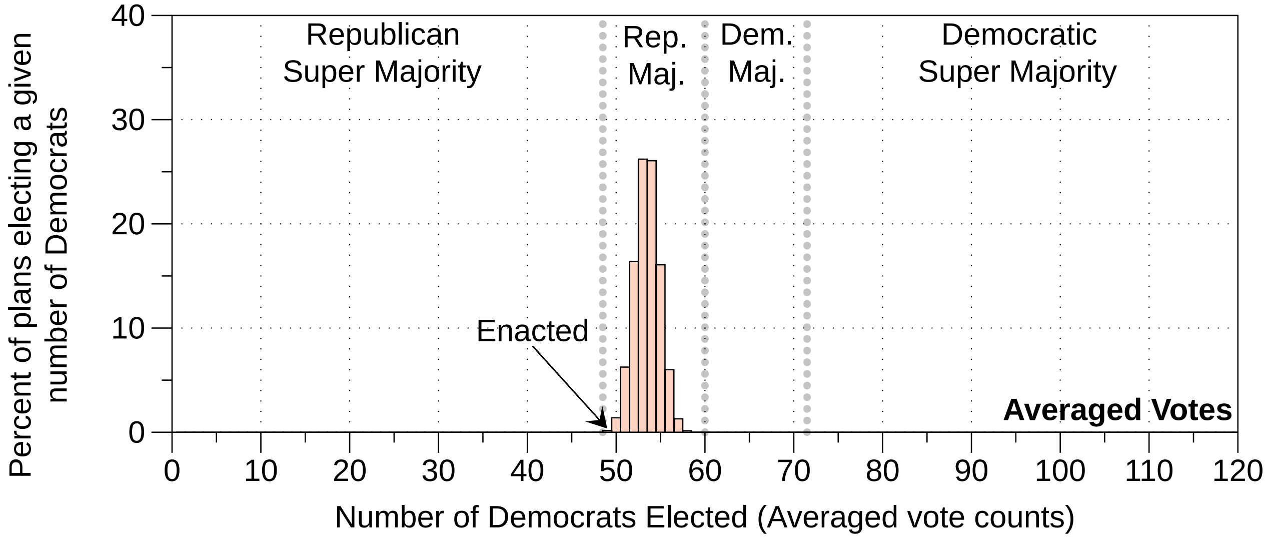


Figure 1: We compare Dr. Barber's statewide ensemble with the enacted plan under the Averaged election results used in his report. We find that only 0.177% of all of the plans in his ensemble would elect the same or more Republicans.

Election	Statewide Dem. Vote	% of Dr. Barber's Plans electing the same or more Republicans than the enacted plan
Barber's Average Vote	-	0.177%
2020 Governor	52.32%	0.204%
2016 Attorney General	50.20%	1.34%
2020 Attorney General	50.13%	0.00684%
2016 Governor	50.047%	0.215%
2020 President	49.36%	0.000146%
2020 Senate	49.14%	0.00804%
2020 Lt. Governor	48.40%	0.000377%
2016 President	48.024%	1.02%
2016 Senate	46.98%	0.223%
2016 Lt. Governor	46.59%	0.518%

Table 1: When considered at the statewide level, the ensembles produced by Dr. Barber are all extreme outliers. The chance that a plan drawn from the ensemble would elect the same or more Republicans as the enacted plan is, at most, 1.34%; in all but three of the elections it is less than 0.25%. We have ordered the elections with the election with the largest Democratic statewide vote fraction at the top and the election with largest Republican statewide vote fraction at the bottom. It is worth noting that many of the most extreme outliers happen for those between 50% and 48%. Looking at Figure 2, we see that this is the range where the Republicans would typically lose the super majority according to Dr. Barber's analysis. Though "Barber's Average Vote" which he used as a partisan index might or might not represent an actual plausible voting pattern, we have included it for comparison.

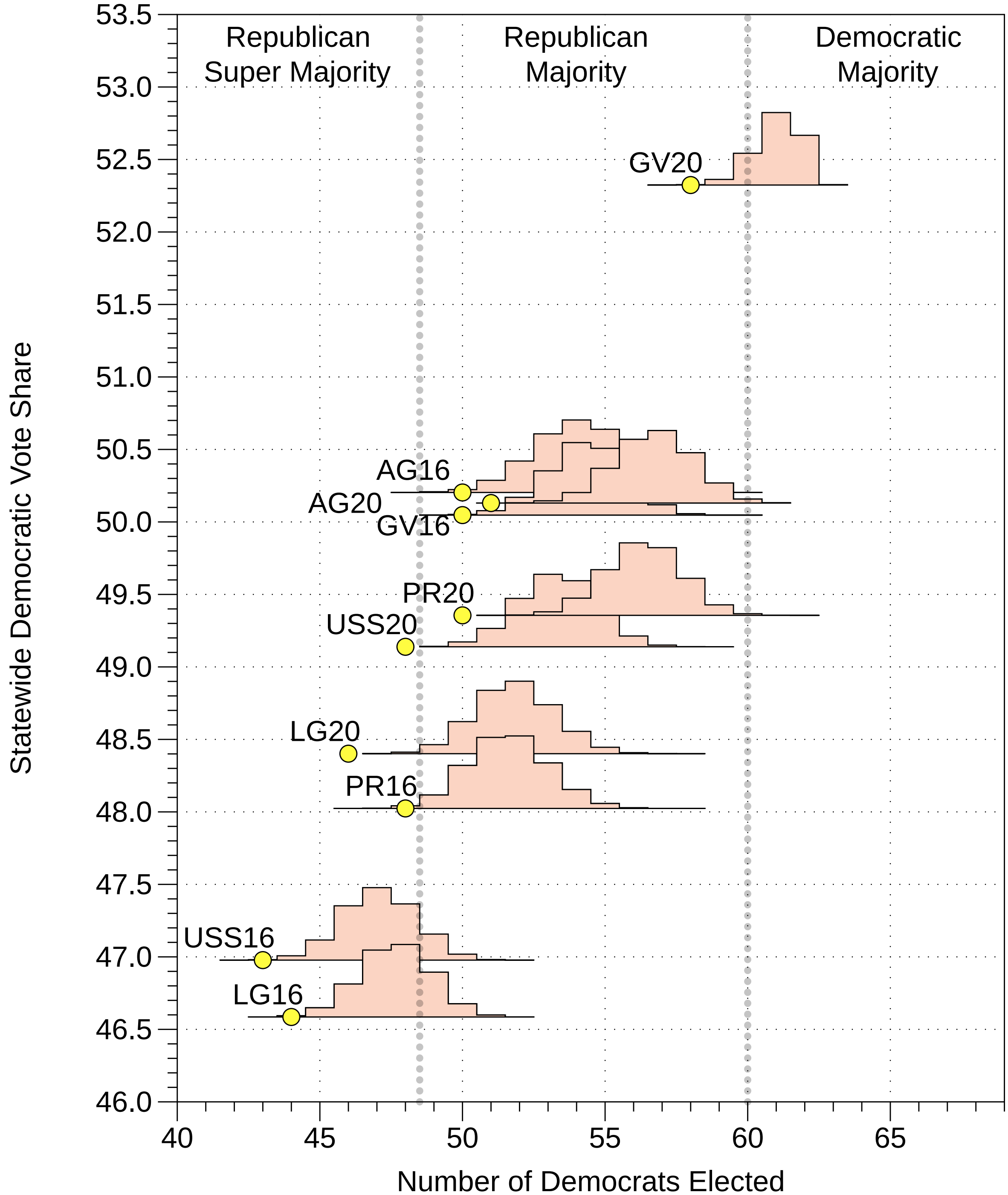


Figure 2: We compare Dr. Barber's statewide ensemble with the enacted plan under the ten 2016 and 2020 elections used in his report. Yellow dots show the result of the enacted plan. The enacted plan is an extreme outlier when considering the same data under a statewide lens. We summarize the numerical extent of the outliers in Table 1. The elections are abbreviated with the last two digits signifying the year, and the first letters representing Lt. Governor (LG), Governor (GV), President (PR), and US Senate (USS).

5 Statewide Analysis of Dr. Barber's Ensemble of NC Senate Plans

Repeating the above analysis for Dr. Barber's ensemble of Senate plans, we begin with the averaged statewide vote counts. We construct the statewide probabilities of electing various numbers of Senators and present them in Figure 3. Once again, our count of Democrats elected includes the Democrats elected in single-district Senate clusters, which are omitted from Dr. Barbers Table 32. So our Figure 3 reports that the enacted plan elects 20 Democrats under Dr. Barbers composite of elections, which is the four Democrats elected in single-district clusters that Dr. Barber reports in his Table 31 plus the 16 Democrats elected in multi-district clusters that Dr. Barber reports in his Table 32. Only 0.00385% of all of the plans in Dr. Barber's ensemble elect the same or more Republicans. Furthermore, this is the percentage of plans that lead to a Republican supermajority under these votes (which the enacted plan would produce as well). In other words, while the enacted plan always produces a Republican supermajority under Dr. Barber's analysis, only .00385% of the non-partisan plans that Dr. Barber simulates would produce a Republican supermajority.

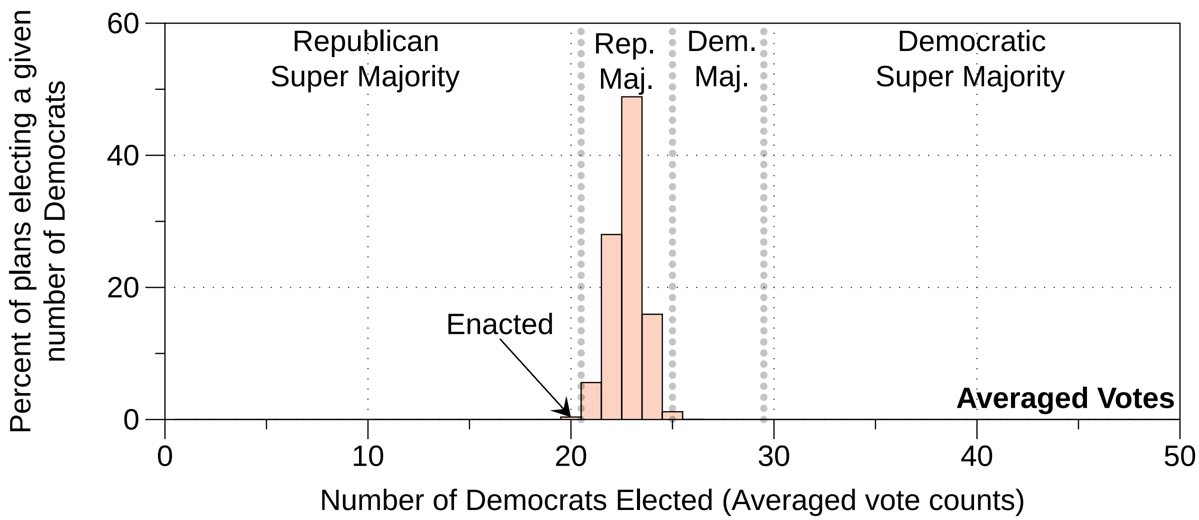


Figure 3: We compare Dr. Barber's statewide ensemble with the enacted plan under the Averaged election results used in his report. We find that only 0.00385% of all of the plans in his ensemble would elect the same or more Republicans than the enacted plan.

We repeat the above analysis with the 2016 and 2020 election data used by Dr. Barber. The only supplemental data we introduce is the number of single district Democratic clusters in each election which we have taken from our previous analysis. We summarize the 10 elections in Figure 4 and Table 2.

Again, we find that the outlier status of the ensemble has a significant impact on the amount of power the Republicans can amass in the Senate. Under the votes of the 2016 Governor race and 2016 Attorney General races, the Republicans lose their supermajority in 99.9544% and 98.9501% of the plans in Dr. Barber's ensemble, respectively. However, the enacted plan would elect a Republican supermajority under each of these voting patterns.

Election	Statewide Dem. Vote	% of Dr. Barber's Plans electing the same or more Republicans than the enacted plan
Averaged	-	0.00385%
2020 Governor	52.32%	1.92%
2016 Attorney General	50.20%	1.05%
2016 Governor	50.047%	0.047%
2020 Attorney General	50.13%	3.74%
2020 President	49.36%	9.92%
2020 Senate	49.14%	5.76%
2020 Lt. Governor	48.40%	0.250%
2016 President	48.024%	0.16%
2016 Senate	46.98%	1.22%
2016 Lt. Governor	46.59%	10.9%

Table 2: When considered at the statewide level, many of the ensembles produced by Dr. Barber are extreme outliers. In six of the ten elections, there is less than a 2% chance that a plan drawn from the ensemble would elect the same or more Republicans as the enacted plan; in three of the ten elections, there is less than a 0.251% chance that a plan drawn from the ensemble would elect the same or more Republicans than the enacted plan. As we have remarked in both our original report and in the analysis below, this *does not* mean that the enacted plan is not an extreme partisan gerrymander under the other four elections; it only indicates that the plan is not as extreme of an outlier in these elections under the particular lens of seat counts.

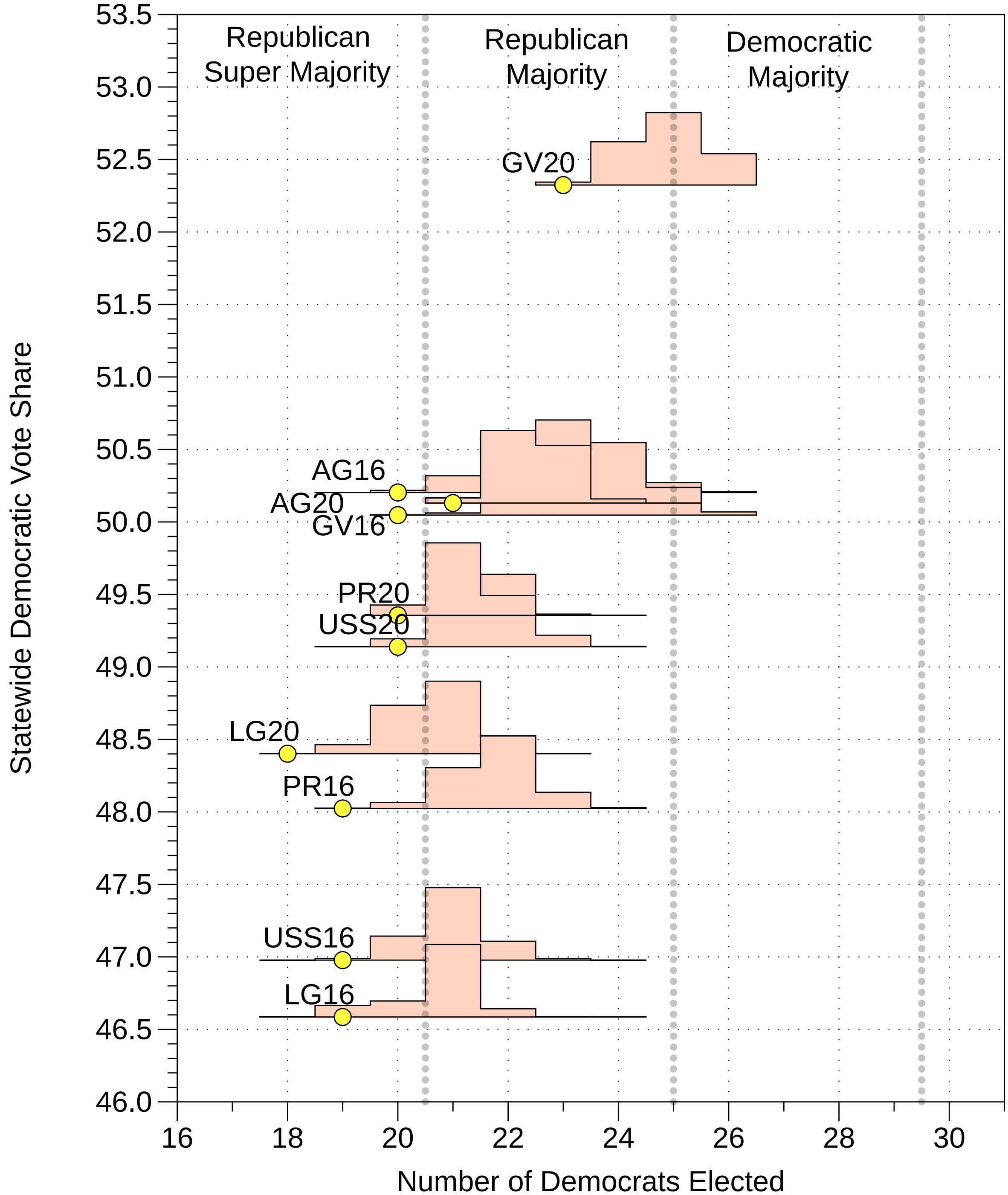


Figure 4: We compare Dr. Barber's statewide ensemble with the enacted plan under the ten 2016 and 2020 elections used in his report. Yellow dots show the result of the enacted plan. The enacted plan is an extreme outlier when considering the same data under a statewide lens. We summarize the numerical extent of the outliers in Table 1. The elections are abbreviated with the last two digits signifying the year, and the first letters representing Lt. Governor (LG), Governor (GV), President (PR), and US Senate (USS).

6 Cluster by Cluster Analysis

We now turn to examining certain clusters presented in Dr. Barber's work. We do not exhaustively examine all of the clusters. Rather, we select certain clusters to demonstrate how the lens that Dr. Barber chooses to use (namely only looking at the number of Democratic districts) yields an incomplete picture of the partisan make up of the districts even with respect to the individual districts.

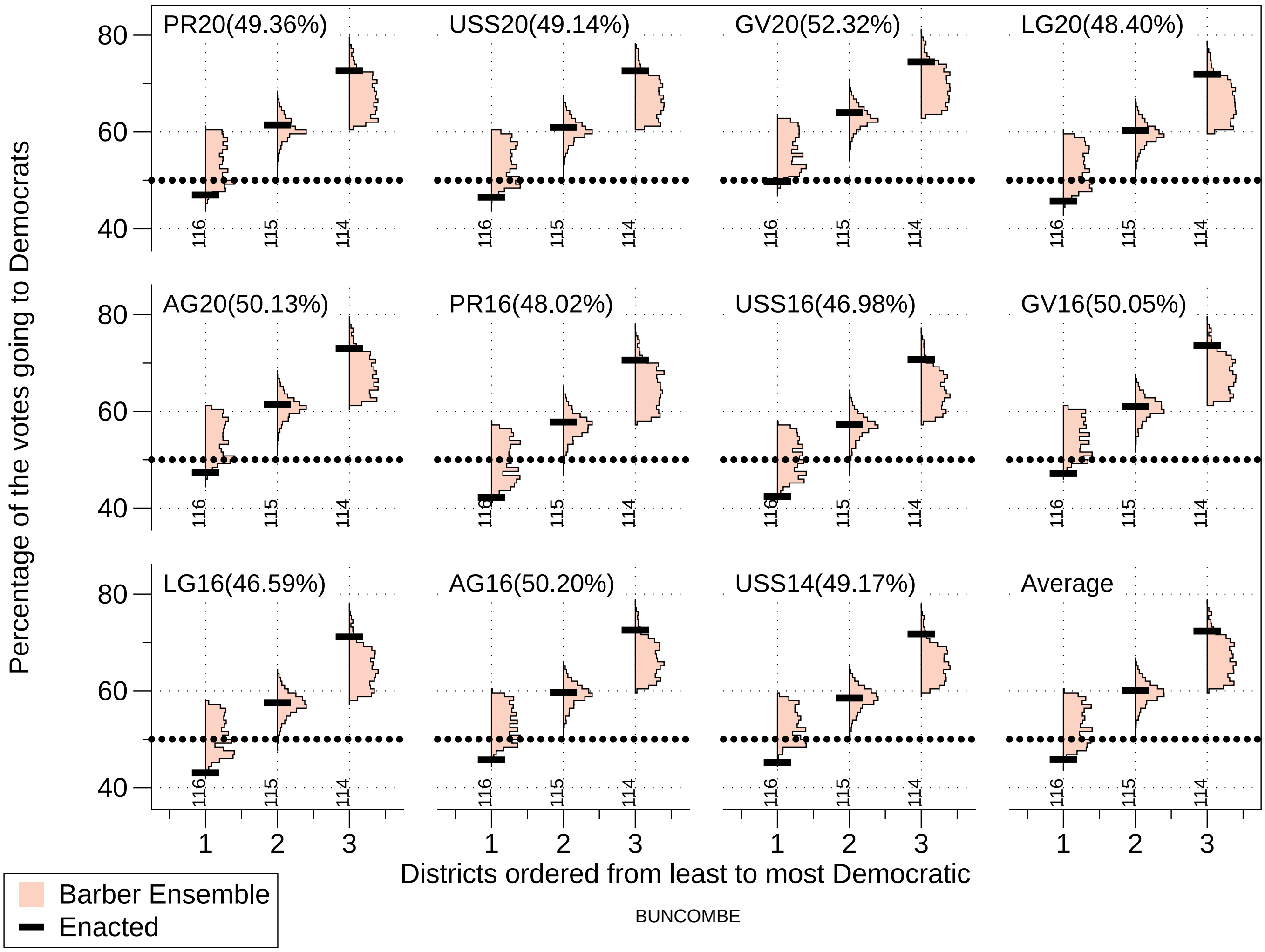
For a more complete picture, one would need to look at the actual partisan make-up of each district within a cluster. In fact, Dr. Barber reported on these values for the enacted plan, but did not compare these values to those found in his ensemble. One way of comparing these numbers is to examine the rank ordered marginal distributions of the vote fraction in each district. To do this, we order the districts from least to most Democratic (what Dr. Barber calls the Partisan Lean of Districts), and then look at the distribution of the most Republican, second most Republican, etc..., all the way until we reach the most Democratic district.

This type of analysis reveals not only how many Democratic leaning districts are within Dr. Barber's ensemble, but also *how much* they lean Democratic (or Republican). As we have demonstrated in our report, this is also relevant at a statewide level.

Note that all of our previous statewide analysis of seat counts simply relied on the numbers presented in Dr. Barber's report, i.e., the exact same ensemble that he relies on. The analysis below uses an ensemble of plans derived from running Dr. Barbers code (we were unable to extract his ensembles he used from the data he provided).[2] However, re-running his same code with his exact same input parameters should produce a comparable ensemble to the one he generated from the report, assuming that his code performs in the way he represents.

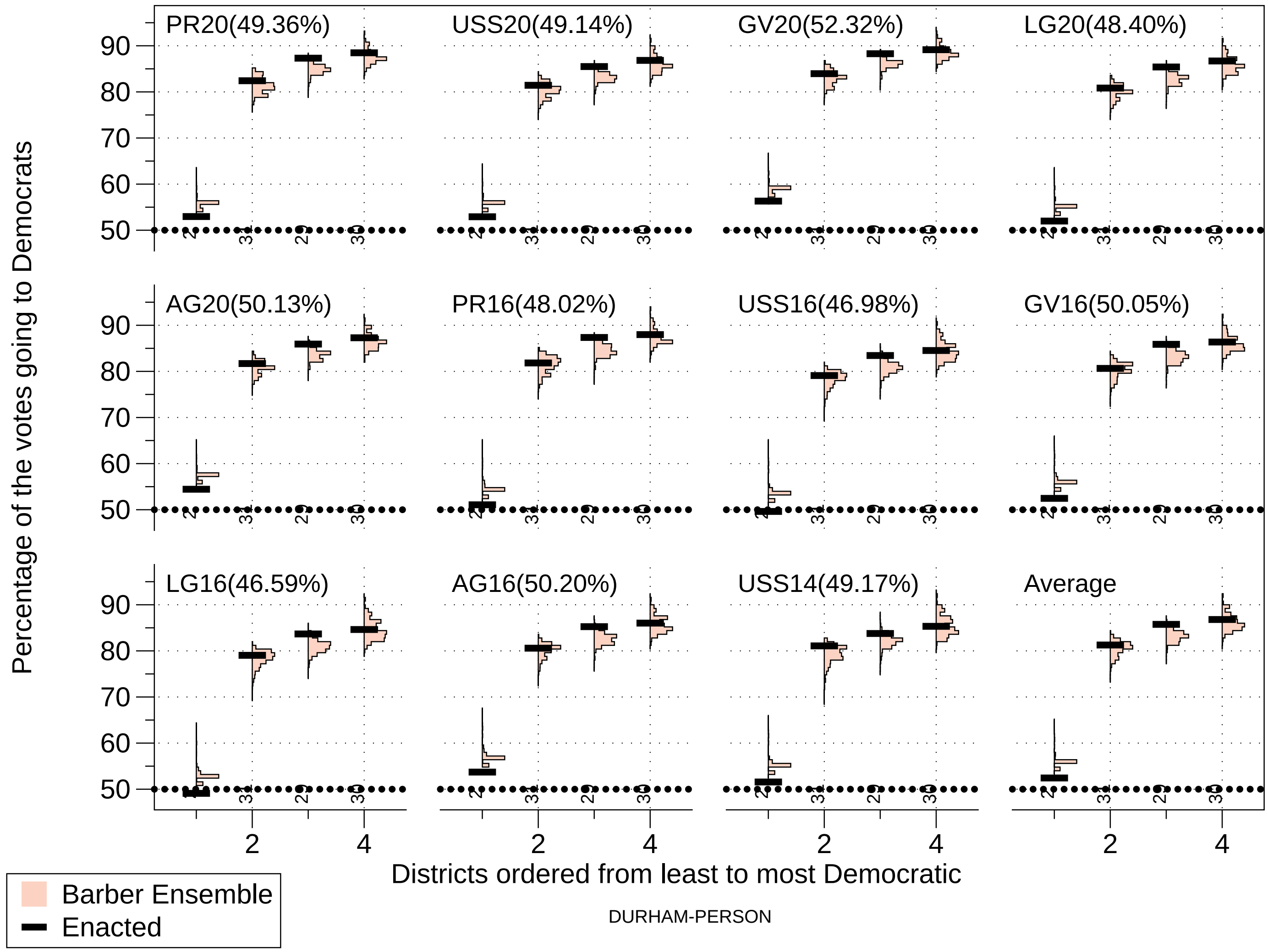
The main conclusion is that when comparing the cluster-by-cluster results from Dr. Barber's ensemble to those in our report, we find the qualitative structure to be the same. We again conclude that the enacted map is an extreme outlier when using Dr. Barber's ensemble with this additional analysis. We include a number of county clusters from the NC House. We make a number of comments in the caption of each figure. We refer the reader to our initial report to the court for a description of these Ranked-Ordered-Marginal-Histograms.

[2]We obtained the ensemble data from runs of Dr. Barber's code from Wes Pegden (CMU) who ran the code on his R installation as we did not have a computing environment able to run the code conveniently during the window when the rebuttal reports were due.



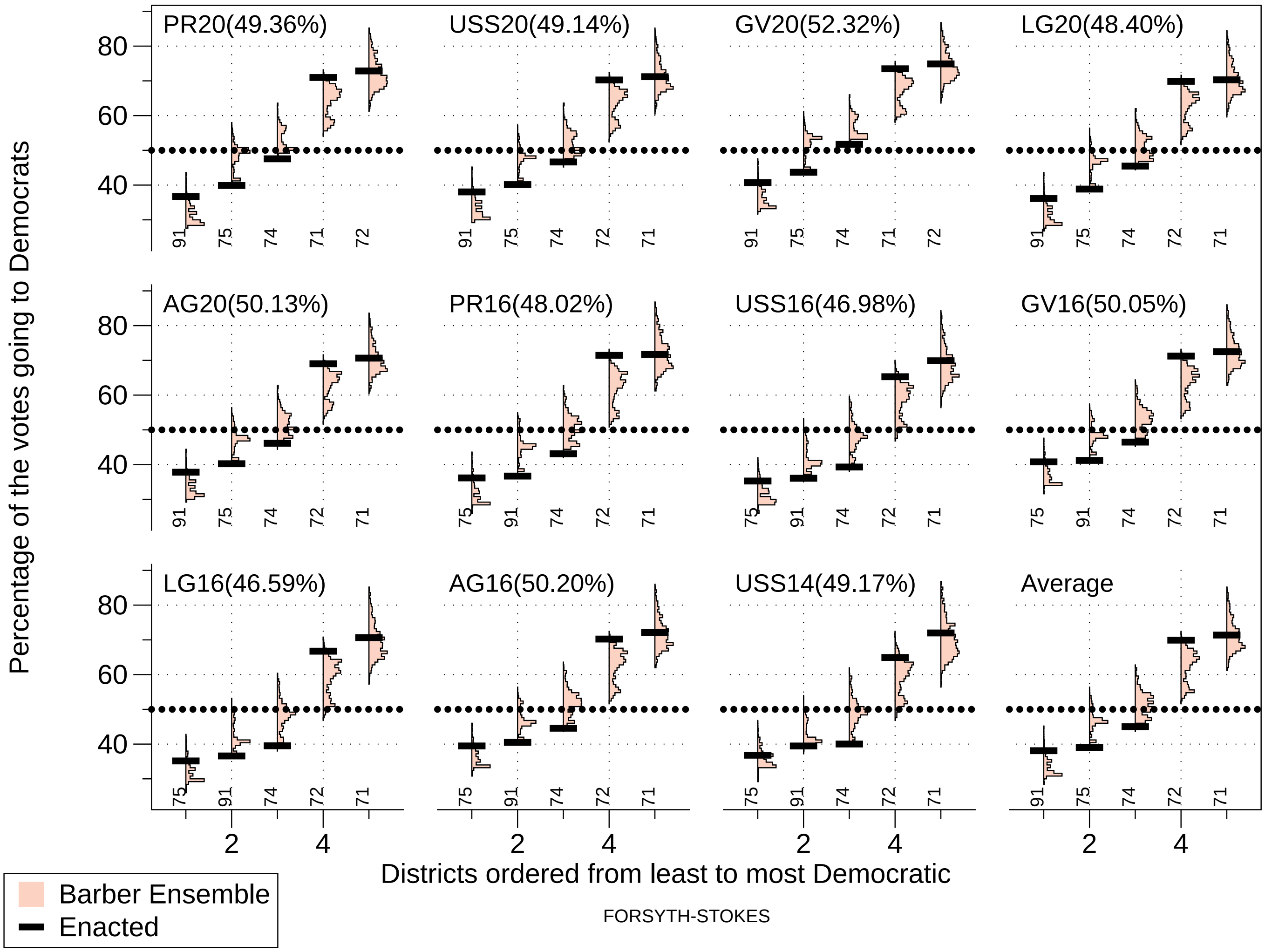
Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	107	0.277	2409	6.23	38664	1	3
PR20	756	1.96	3095	8.0	38664	1	3
USS20	409	1.06	2529	6.54	38664	1	3
GV20	662	1.71	3200	8.28	38664	1	3
LG20	424	1.1	2624	6.79	38664	1	3
AG20	534	1.38	2655	6.87	38664	1	3
PR16	321	0.83	2701	6.99	38664	1	3
USS16	17	0.044	2062	5.33	38664	1	3
GV16	18	0.0466	2067	5.35	38664	1	3
LG16	18	0.0466	1998	5.17	38664	1	3
AG16	17	0.044	1992	5.15	38664	1	3
USS14	3	0.00776	1807	4.67	38664	1	3

Figure 5: In Buncombe County, the Enacted maps is an extreme outlier under Dr. Barber's ensemble. We see the same structure as we saw when compared with the probability ensemble our initial report. The most Republican district in the enacted plan has exceptionally few Democrats while the most Democratic district has exceptionally many Democrats. The result is that the Democrats never win three seats in the enacted plan under any of the elections considered, including Dr. Barber's composite "Averaged Election", even though they would typically do so under a number of elections under Dr. Barber's ensemble.



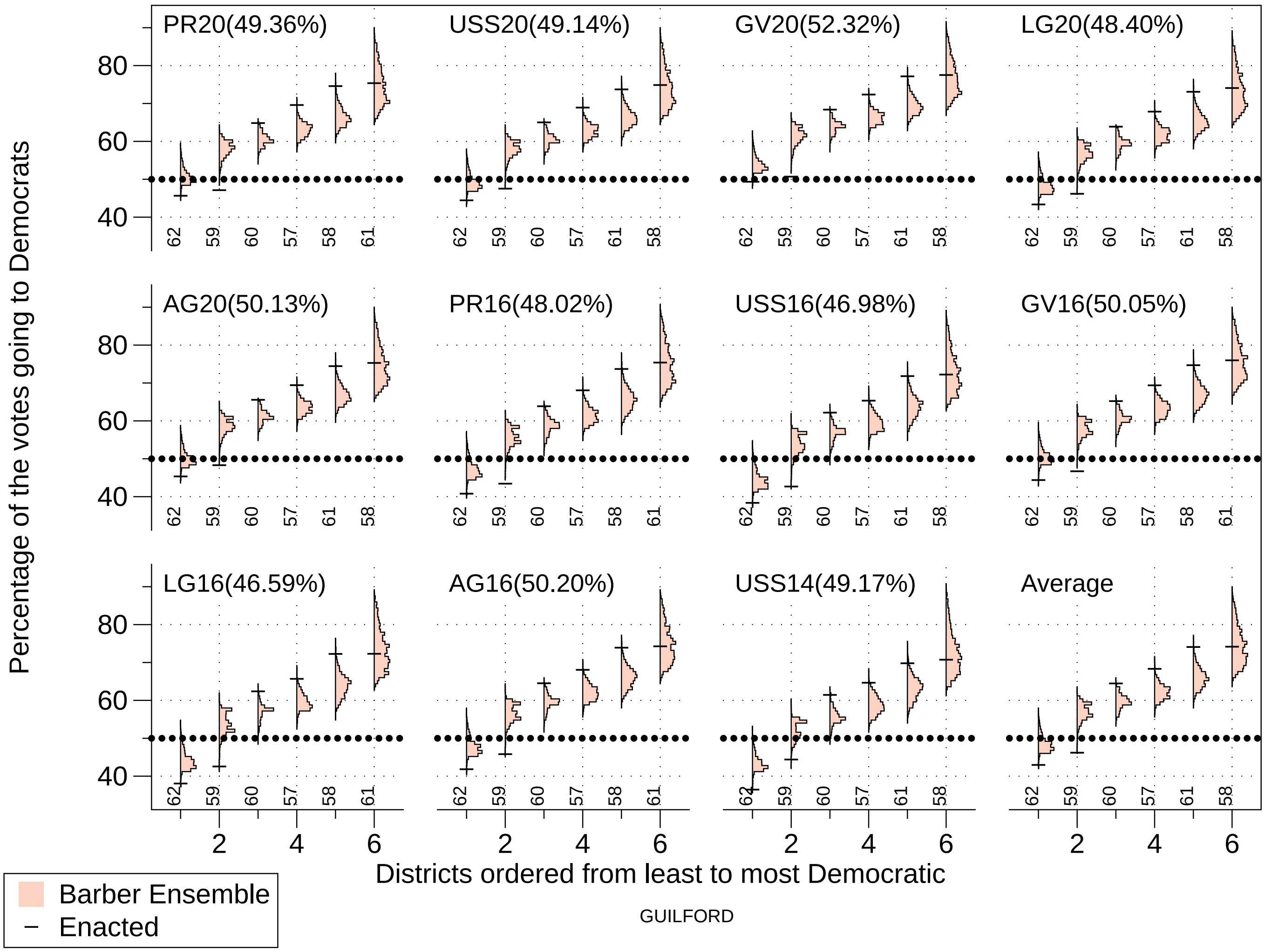
Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	0	0.0	1396	3.69	37800	1	3 4
PR20	0	0.0	790	2.09	37800	1	3 4
USS20	0	0.0	1326	3.51	37800	1	3 4
GV20	0	0.0	1123	2.97	37800	1	3 4
LG20	0	0.0	1199	3.17	37800	1	3 4
AG20	0	0.0	1205	3.19	37800	1	3 4
PR16	0	0.0	1184	3.13	37800	1	3 4
USS16	0	0.0	2932	7.76	37800	1	3 4
GV16	0	0.0	1382	3.66	37800	1	3 4
LG16	0	0.0	2675	7.08	37800	1	3 4
AG16	0	0.0	1931	5.11	37800	1	3 4
USS14	0	0.0	10357	27.4	37800	1	3 4

Figure 6: In the Durham-Person cluster, we the same outlier structure in the enacted map when compared to Dr. Barber's ensemble as when compared to the primary ensemble in our orignal report. We see that the most Republican district has been depleted of Democrates. This makes the district much more competitive than it typically would be under a non-partisan redistricting plan.



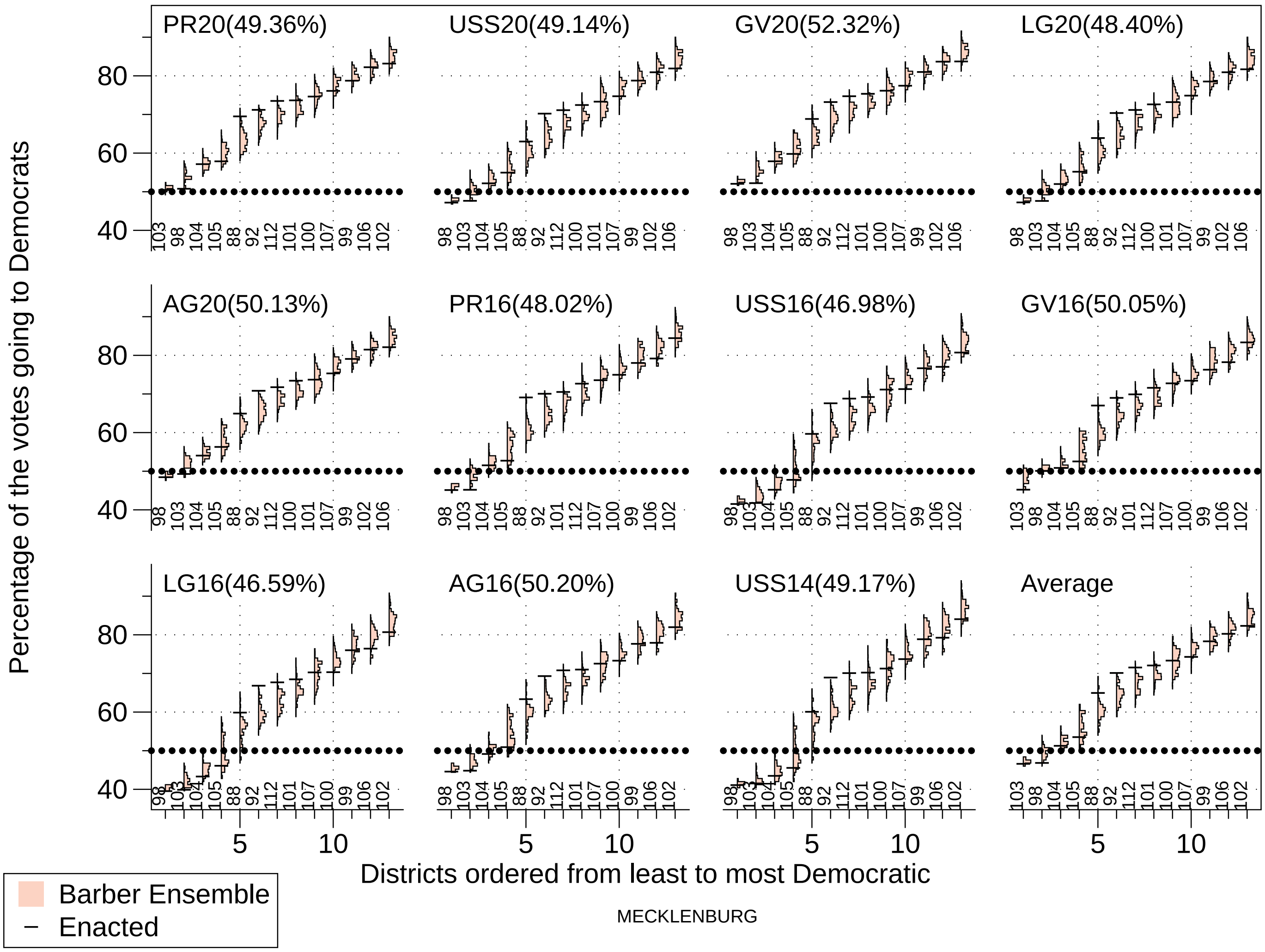
Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	17	0.456	317	8.51	3726	1 2 3	4 5
PR20	4	0.107	349	9.37	3726	1 2 3	4 5
USS20	60	1.61	429	11.5	3726	1 2 3	4 5
GV20	2	0.0537	357	9.58	3726	1 2 3	4 5
LG20	21	0.564	376	10.1	3726	1 2 3	4 5
AG20	47	1.26	395	10.6	3726	1 2 3	4 5
PR16	7	0.188	284	7.62	3726	1 2 3	4 5
USS16	44	1.18	280	7.51	3726	1 2 3	4 5
GV16	11	0.295	292	7.84	3726	1 2 3	4 5
LG16	30	0.805	269	7.22	3726	1 2 3	4 5
AG16	25	0.671	263	7.06	3726	1 2 3	4 5
USS14	13	0.349	351	9.42	3726	1 2 3	4 5

Figure 7: In the Forsyth-Stokes cluster, We again see the same structure in Dr. Barber's ensemble as in the primary ensemble from our initial report. We see abnormally few Democrats in the second and third most Republican districts while we see abnormally many Democrats in the most Republican district and in the two most Democratic districts. The effect is to regularly flip the 3rd most Republican district to the republicans under the enacted map even under elections where many to almost all of the plans in Dr. Barber's ensemble would have awarded the seat to the Democrats.



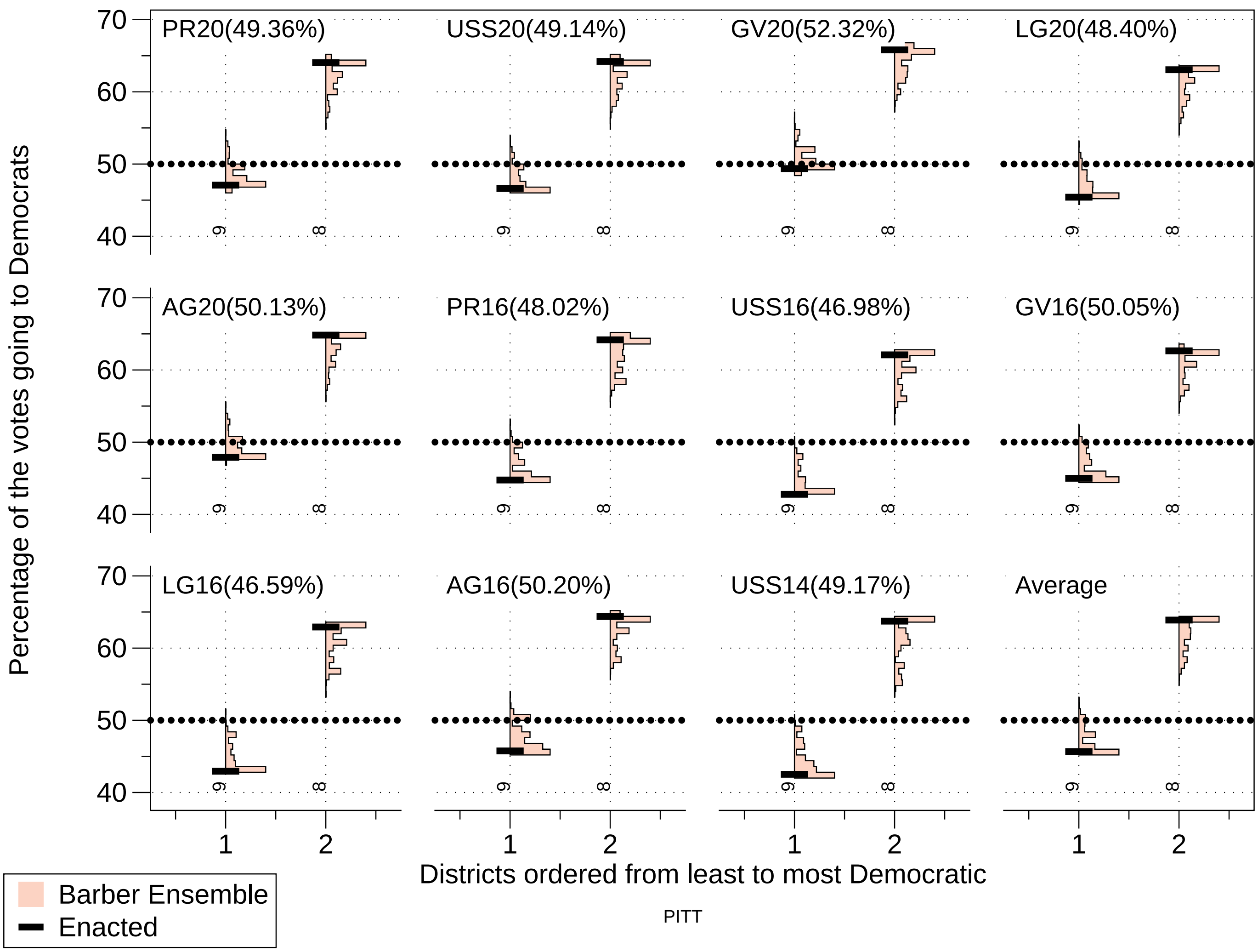
Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	0	0.0	0	0.0	15489	1 2	3 4 5 6
PR20	0	0.0	0	0.0	15489	1 2	3 4 5 6
USS20	0	0.0	0	0.0	15489	1 2	3 4 5 6
GV20	0	0.0	0	0.0	15489	1 2	3 4 5 6
LG20	0	0.0	0	0.0	15489	1 2	3 4 5 6
AG20	0	0.0	0	0.0	15489	1 2	3 4 5 6
PR16	0	0.0	0	0.0	15489	1 2	3 4 5 6
USS16	0	0.0	0	0.0	15489	1 2	3 4 5 6
GV16	0	0.0	0	0.0	15489	1 2	3 4 5 6
LG16	0	0.0	0	0.0	15489	1 2	3 4 5 6
AG16	0	0.0	0	0.0	15489	1 2	3 4 5 6
USS14	0	0.0	0	0.0	15489	1 2	3 4 5 6

Figure 8: Dr. Barber did identify Guilford county as a Republican Gerrymander in the enacted map. The structure which produces this result is clear when compared with this plot of Dr. Barber's ensemble. We see that the two most Republican districts have abnormally few Democrats and the next three Republican districts have abnormally many Democrats. The effect is that the second most Republican seat reliably goes to the Republican party even though in some elections almost all of the maps in Dr. Barber's ensemble would award the seat to the Democrats. This was the same structure seen in the plots of our primary ensemble from our initial report.



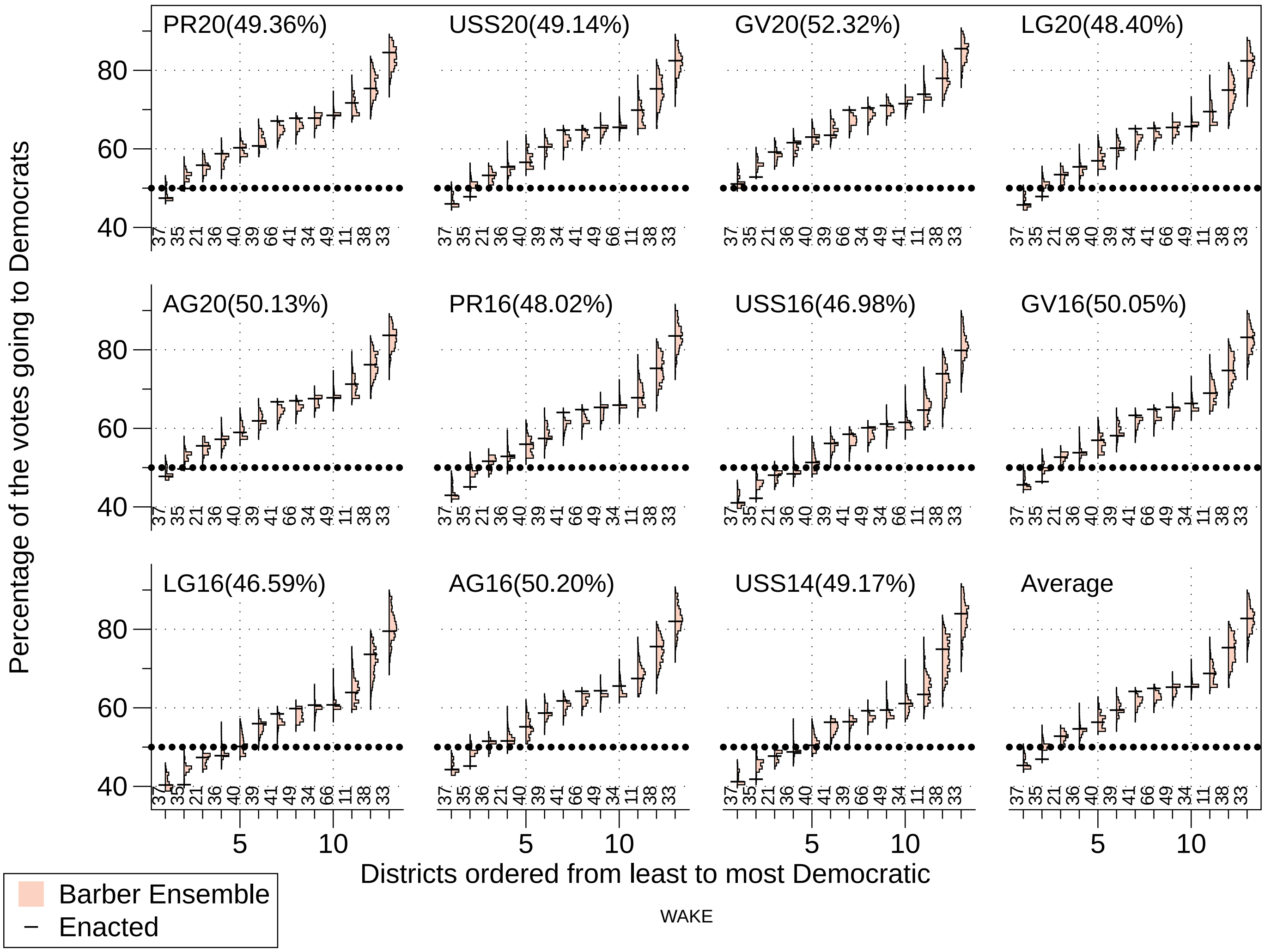
Election	No. plans w/ $\leq$ Dems (First Cluster)	% of plans w/ $\leq$ Dems (First Cluster)	No. plans w/ $\geq$ Dems (Second Cluster)	% of plans w/ $\geq$ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	139	4.4	14	0.443	3161	1 2 3 4	5 6 7 8
PR20	105	3.32	18	0.569	3161	1 2 3 4	5 6 7 8
USS20	145	4.59	29	0.917	3161	1 2 3 4	5 6 7 8
GV20	114	3.61	17	0.538	3161	1 2 3 4	5 6 7 8
LG20	117	3.7	17	0.538	3161	1 2 3 4	5 6 7 8
AG20	119	3.76	17	0.538	3161	1 2 3 4	5 6 7 8
PR16	23	0.728	18	0.569	3161	1 2 3 4	5 6 7 8
USS16	74	2.34	15	0.475	3161	1 2 3 4	5 6 7 8
GV16	56	1.77	23	0.728	3161	1 2 3 4	5 6 7 8
LG16	68	2.15	18	0.569	3161	1 2 3 4	5 6 7 8
AG16	52	1.65	15	0.475	3161	1 2 3 4	5 6 7 8
USS14	153	4.84	16	0.506	3161	1 2 3 4	5 6 7 8

Figure 9: In Mecklenburg county, we again have that the four most Republican districts have abnormally few Democrats in them while the next four most Republican districts have abnormally many Democrats. This is the same structure as we saw under our primary ensemble in our initial report. The effect is that in a number of elections the Republican party wins one to two more seats than the typical plan from Dr. Barber's ensemble would award.



Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	314	6.05	1929	37.2	5189	1	2
PR20	1539	29.7	1974	38.0	5189	1	2
USS20	1525	29.4	1929	37.2	5189	1	2
GV20	1556	30.0	1974	38.0	5189	1	2
LG20	1537	29.6	1974	38.0	5189	1	2
AG20	1537	29.6	1974	38.0	5189	1	2
PR16	483	9.31	1929	37.2	5189	1	2
USS16	0	0.0	1660	32.0	5189	1	2
GV16	483	9.31	1929	37.2	5189	1	2
LG16	0	0.0	1660	32.0	5189	1	2
AG16	169	3.26	1660	32.0	5189	1	2
USS14	0	0.0	1660	32.0	5189	1	2

Figure 10: In Pitt county we see that same structure we found in our Primary ensemble repeated in Dr. Barber's ensemble. In particular, we see the districts pulled to the extremes of what is seen in Dr. Barber's ensemble. The depletion of Democrats from the more Republican district protects it from electing a Democrat in the enacted plan even though it would elect a Democrat in many of the plans in Dr. Barber's ensemble in a few of the elections we considered.



Election	No. plans w/ ≤ Dems (First Cluster)	% of plans w/ ≤ Dems (First Cluster)	No. plans w/ ≥ Dems (Second Cluster)	% of plans w/ ≥ Dems (Second Cluster)	Total Plans	First Cluster	Second Cluster
Average	159	1.11	2649	18.5	14305	1 2	3 4 5 6 7 8
PR20	140	0.979	1872	13.1	14305	1 2	3 4 5 6 7 8
USS20	209	1.46	2961	20.7	14305	1 2	3 4 5 6 7 8
GV20	145	1.01	1772	12.4	14305	1 2	3 4 5 6 7 8
LG20	159	1.11	2240	15.7	14305	1 2	3 4 5 6 7 8
AG20	165	1.15	2260	15.8	14305	1 2	3 4 5 6 7 8
PR16	137	0.958	2264	15.8	14305	1 2	3 4 5 6 7 8
USS16	196	1.37	3774	26.4	14305	1 2	3 4 5 6 7 8
GV16	220	1.54	3504	24.5	14305	1 2	3 4 5 6 7 8
LG16	196	1.37	2707	18.9	14305	1 2	3 4 5 6 7 8
AG16	205	1.43	3076	21.5	14305	1 2	3 4 5 6 7 8
USS14	287	2.01	3632	25.4	14305	1 2	3 4 5 6 7 8

Figure 11: In Wake county, we see that the number of Democrats in the first two districts is exceptionally low. Looking across the different Ranked Ordered Marginal Histograms, we see that this increases the electoral environments (as captured in different elections) in which the Republican party wins one of these two districts. In particular, Dr. Barber's ensemble would lead to the Democrats typically winning one of these two districts in cases where the enacted plan does not.

7 Comments on Sampling Methods

We now give some additional details to clarify some of the terms we used and the procedures we followed in sampling of the legislative maps in our original report in light of the discussion in Dr. Barber's report.

We recall that in the Legislative case we used parallel tempering to interpolate between a base measure equal to the uniform measure on spanning forests given the county and population constraints and a measure centered on the districts with a compactness similar to the enacted plan. The Primary ensemble for the legislative ensemble reported in the report was the latter of these two ensembles. The first of these ensembles would be the target distribution of the SMC algorithms from the *rdist* package when it is properly configured with resampling included. We took 4 million steps (proposals the Metropolis-Hastings algorithm) at the spanning tree level and 2 million steps on the other levels. We output maps every 25 steps for a total of 160,000 maps in the 4 million step case and 80,000 map in the 2 million step cases. We interpolated between the different ensembles using between 60 and 100 parallel tempering levels. We proposed switching between the parallel tempering levels every 100 steps. In some cases, we ran a number of clusters together in one sampling run and sometimes we ran them separately or is smaller subgroups in a single run. Generally we ran the larger, more compacted clusters such as Wake or Mecklenburg, in this way.[3] As described in the original report, *independent sample reservoirs* were used to split the 60 to 100 levels into computationally feasible chunks. This also improved the mixing and decorrelation properties of our algorithm. The congressional ensemble was drawn from a measure with a compactness weight against the same tree measure that the resampled rdist algorithm would sample. We used 12 parallel temping levels to move between the distribution without a compactness measure and the finial target distribution with the sampling weight. The number of steps was as specified above. The weights and other parameters used in the different run are specified in the header files of the datasets.

[3]For one run in the Senate, we only ran Granville-Wake for 1 million steps as we had strong evidence that this was sufficient for the parameter values being considered.

I declare under penalty of perjury under the laws of the state of North Carolina that the foregoing is true and correct to the best of my knowledge.

Jonathan Mattingly, 12/28/2021

EXHIBIT F

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
21 CVS 015426
21 CVS 500085

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, et al.,

Plaintiffs,

vs.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

REBECCA HARPER, et al.,

Plaintiffs,

vs.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

EXPERT REPORT OF
DR. JEFFREY B. LEWIS

Pursuant to the North Carolina Rules of Civil Procedure and the Case Management Orders of the Court in the above-captioned matter, I, Jeffrey B. Lewis, provide the following written report:

1. I am a Professor of Political Science at the University of California, Los Angeles (UCLA). I am also the past department chair of UCLA's political science department and past president of the Society for Political Methodology. I have been a member of the UCLA faculty since 2001. Prior to that, I was an Assistant Professor of Politics and Public Affairs at Princeton University from 1998 to 2001. I earned my B.A. in Political

NCLCV v. Hall
21 CVS 15426
LDTX200

Witness:
Jeffrey Lewis, Ph.D.
Ex 1
12/31/21 D. Myers Byrd

Science and Economics from Wesleyan University in 1990 and my Ph.D. in Political Science from the Massachusetts Institute of Technology (MIT) in 1998. My main area of specialization is quantitative political methodology with a focus on making inferences about preferences and behavior from the analysis of voting patterns in the mass public and in legislatures. I have published on the topic of ecological inference – the challenge that arises when one wants to know how individuals of different types voted in an election, but one can only observe electoral data aggregated to the precinct, county or other summary level. A true, accurate, and complete copy of my curriculum vitae is attached as Exhibit A.

2. I have previously been retained as an expert in relation to nine court cases: one involving allegations of voting machine failure in Florida (Jennings v. Elections Can-vassing Commission of State of Florida), four involving claims of minority vote dilution in California (Avitia v. Tulare Local Healthcare District; Satorre et al. v. San Mateo County Board of Supervisors et al.; Ladonna Yumori-Kaku v. City of Santa Clara); and Pico Neighborhood Association and Maria Loya v. City of Santa Monica), one involving claims of minority vote dilution in Texas (Perez, et al. v. Abbott, et al.), one involving claims of minority vote dilution in North Carolina (Common Cause, et al. v. Lewis), one involving claims of minority vote dilution in Washington (Aguilar v. Yakima County), and one involving the compactness of legislative districts in Illinois (Radogno et al v. Illinois State Board of Elections, et al.). I testified as an expert in the cases of Ladonna Yumori-Kaku v. City of Santa Clara and Pico Neighborhood Association and Maria Loya v. City of Santa Monica.
3. I am being compensated at a rate of $550/hour.
4. In the attached tables and spreadsheet, at Exhibit B, I present summaries of the results of North Carolina general and Democratic primary election contests held in 2014, 2016, 2018, and 2020. In particular, I consider how each contest would have turned out if only the votes of those residing in each current and in each enacted State House, State Senate, and Congressional district had been counted.
5. This exercise allows us to consider the voting strength of the Black voters in each existing and proposed legislative district.

6. For each of these "reconstituted" election contest in each district, I used weighted ecological regression (ER) to estimate the degree of Black voter cohesion and non-Black voter crossover (hereafter "white crossover"). In some cases, the number of voting precincts available for the analysis was too small or Black share of voters was too small to meaningfully apply ER. I omit such contest-district combinations.
7. I further narrow the set of contests to partisan races for executive and legislative offices. And, I only "reconstitute" a given contest within a given district if the data indicate that at least 80 percent of the voters in the given election who resided the district, voted in the given contest.
8. I identify the "Black-preferred" candidate in each contest as the candidate estimated by ER to have received the largest share of Black votes in the given contest or, in the case of single-candidate elections, that candidate if they are a Democrat (single-candidate elections without a Democrat are considered not to have a Black-preferred candidate).
9. I also note whether each candidate is Black and whether each contest includes at least one Black candidate.
10. The tabulations and estimates are based on datasets that I downloaded from the North Carolina Board of Elections (SBOE) website with the exception of a crosswalk between the current and enacted legislative districts and voting precincts used in the 2014, 2016, 2018, and 2020 elections and estimates of Black Voting-Age population (VAP) by district that were provided by Clark Bensen of POLIDATA.
11. The race of each candidate was determined by looking up each candidate listed in the SBOE's candidate list datasets on the North Carolina voter list (also from the SBOE). In some cases, a candidate's race could not be determined because: their legal name matched no voter on the voter list, no race was indicated on the voter list, or they were matched to several voters of different races on the voter list. In total, over 1,800 Black candidates were identified (including many competing in contests not subsequently analyzed for the reasons described above).
12. The demographic composition of voters from each precinct needed to perform ER was derived by merging vote history records from the SBOE to the precinct election returns. Because some counties do not allocate "One Stop" and absentee votes back to precincts (and for other reasons), not all voters can be matched to a voting precinct and not all

precincts can be placed in legislative districts. Where One Stop and absentee ballots were allocated to regular voting precincts, the voting and demography within each precinct was broken down by voting method when performing ER. This is possible because the vote history records (which are used to estimate the fraction of voters in each precinct who were Black) are broken down by voting method (as sometimes are the election returns within each precinct). When a county reported One Stop or absentee votes without allocating them to precincts and where feasible, I aggregated the One Stop and absentee votes in the election returns and the One Stop and absentee voters into a single One Stop and a single absentee precinct. Given the need to break down the votes by legislative district, this was only feasible in counties that fall entirely within a single State House, State Senate, or Congressional district.

13. The attached tables summarize the reconstituted elections analysis. For each district, the tables show averages of many of the quantities described above as well as: the Black-preferred candidate "win rate" (the fraction of Black-preferred candidates who would have won if the contest had only been held in the given district); the percent of Black-preferred candidates who were Democrats; the average number of major-party candidates in the reconstituted contests; the average fraction of voters who were Black; and, an estimate of the average minimum fraction of those voting in the district that would have had to be Black in order for the Black-preferred candidate to expect to get at least 50 percent of the vote (based on the ER estimates and only applied in contests involving two major-party candidates).
14. The tables present separate results for primary and general elections. Separate tallies are also presented that include only those contests that included at least one Black candidate.
15. The attached spreadsheet *minority_preferred_candidates.csv* identifies the minority-preferred candidate in each of the reconstituted contests considered. It includes the following fields:
    a. *district*, an identifier of the district including its chamber, plan, and number in which the contest is reconstituted.
    b. *election_date*, the date of the election
    c. *election_type,* primary or general
    d. *contest,* the electoral contest being reconstituted.

e. *minority_preferred_candidate,* the name of the minority preferred candidate (as identified by ER).
f. *minority_preferred_party,* the party of the minority-preferred candidate.
g. *cand_is_black,* whether the Black-preferred candidate is Black.
h. *has_minority_candidate,* whether the contest included a Black candidate.
i. *wonlost,* identifies the Black-preferred candidate as a "winner" or "loser" of the reconstituted election (highest-vote getter).
j. *pct_vote,* percent of vote won by the Black-preferred candidate in the reconstituted contest.
k. *ER.pct_black,* average share of voters in the ER analyses who were Black.
l. *ER.black_cohesion,* weighted Ecological Regression (ER) estimates of support for Black-preferred candidate among Black voters in the reconstituted election.
m. *ER.white_crossover,* weighted Ecological Regression (ER) estimates of support for the Black-preferred candidate among white (non-Black) voters in the reconstituted election.
n. *ER.black_pct_needed_for_majority,* Uses the ER estimates to infer the minimum share of the voters in the reconstituted election that would generate majority support for the minority-preferred candidate in the reconstituted election. Note that this is the estimated average percentage of Black voters in the contest needed for a majority, not the percentage of Black VAP existing in the district.
o. *Coverage,* the ratio of the total votes cast in the reconstituted election to the most votes cast in any reconstituted contest in the same district and election expressed as a percentage. In many cases, eligibility to participate in a particular contest will only partially overlap with the district in which the reconstituted election is considered. Because the area of overlap may encompass a set of voters who are not representative of the voters a district as whole when the overlap is small, I consider only contests for which this overlap or "coverage" exceeds 80 percent (for example, this include contests for statewide offices).
p. *number_of_candidates,* The number of major-party candidates in the contest.

16. This analysis goes beyond Professor Dunchin's analysis to consider not just 4 primary and 4 general election contests, but over 420 individual contests including over 190 that

include a Black candidate. These contests include both endogenous and exogenous contests for legislative and executive offices ranging from a Recorder of Deeds to the US President. The analysis also expands on Professor Duchin's analysis by estimating the rate of support of each candidate in each contest within each district to capture variation in Black voter cohesion and white cross-over voting across the districts (whereas Professor Duchin estimates a single rate of cohesion and of cross-over voting statewide for the 8 contests that she considers).

17. Using (without endorsing) Professor Duchin's definition of "effective" Black districts (greater than 75 percent Black preferred win rate in races with minority candidates combined with greater than 25 percent Black voting-age population), an analysis of this larger set of election contests identifies as "effective" the enacted districts that Professor Duchin enumerates (with the exceptions of State Senate District 12 and State House District Districts 066 which do not exhibit a 75 percent win rate in the larger dataset and House District 039 for which too few data precinct points were available to apply ER to identify the Black-preferred candidates). It also identifies as "effective" by Duchin's definition as many as seven additional State House districts and four additional State Senate districts. *See* Table 1.
18. Relaxing Professor Duchin's requirement that an "effective" district must have more than 25 percent Black voting-age population, my more expansive analysis suggests the existence of one additional "effective" Congressional district, four additional "effective" State House districts, and two additional "effective" State Senate districts.
19. Further relaxing the definition of "effective" to those districts in which the Black preferred win rate exceeds 66 percent suggests the existence of seven more "effective" State Senate districts and 16 additional "effective" State House districts. *See* Table 1.
20. Increasing the set of contests considered to include contests without Black candidates further lifts the number of apparently "effective" districts under Duchin's definition.
21. Only two of the "effective" districts (by any of the above definitions) are majority Black VAP. Districts with Black-preferred win rates of over 75 percent in the reconstituted elections include two districts with Black voting-age populations below 7 percent and five districts with Black voting-age populations below 20 percent.

Table 1 – Duchin "Effective" Black Districts in Enacted Plans

	House	Senate	Congress
Number of "Effective" Black Districts in enacted plans using Duchin definition	29	12	2
Number of "Effective" Black Districts in enacted plans using Duchin definition but relaxing 25% BVAP and applying win rate of 66%	49	21	5
Number of "Effective" Black Districts in enacted plans using Duchin definition but relaxing 25% BVAP and applying win rate of 50%	88	40	11

22. In no district, enacted or in 2020, does it appear that a majority Black VAP is needed for that district to regularly generate majority support for minority-preferred candidates in the reconstituted elections.

23. Black voters constitute a powerful political force in North Carolina electoral politics because of their numerical size and highly cohesive voting as well as the sizeable white (non-Black) cross-over vote for Black-preferred candidates that exists particularly in areas of the state in which Black voters are concentrated. As Professor Duchin documents, contemporary Black voting power in North Carolina is such that it is now even possible to draw a set of districts in which Black voters would have effective control (by her definition) of a share of the state's legislative districts that meaningfully exceeds the size of the Black population.

24. I reviewed the "Addendum to Primary Expert Report of Jonathan C. Mattingly, Ph.D." Dr. Mattingly appears to have reconstituted election results in different county cluster options and identified Black VAP in those same clusters. Dr. Mattingly's Addendum is not a racially polarized voting analysis.

CERTIFICATION

I certify that the statements and opinions provided in this report are true and accurate to the best of my knowledge, information, and belief.

____________________________________ _____December 28, 2021_________
Jeffrey B. Lewis, Ph.D. Date

Exhibit A

Jeffrey B. Lewis

Political Science Department
Bunche Hall, UCLA
Los Angeles CA 90095
310.206.1307

2330 Pelham Ave.
Los Angeles CA 90064
310.467.7685
email:jblewis@ucla.edu

Education

Massachusetts Institute of Technology — Cambridge, MA
Ph.D., Department of Political Science, February 1998.

Wesleyan University — Middletown, CT
B.A., Political Science and Economics with Honors in General Scholarship. June 1990.

Academic Experience

University of California Los Angeles — Los Angeles, CA
Professor of Political Science. July 2012–present.

University of California Los Angeles — Los Angeles, CA
Director, Center for American Politics and Public Policy. July 2017–July 2018.

University of California Los Angeles — Los Angeles, CA
Chair, Department of Political Science. July 2011–June 2017.

University of California Los Angeles — Los Angeles, CA
Associate Professor of Political Science. July 2007–June 2012.

University of California Los Angeles — Los Angeles, CA
Assistant Professor of Political Science. July 2001–June 2007.

Dartmouth College,
Rockefeller Center for the Social Sciences — Hanover, NH
Research Fellow. July 2000–June 2001.

Princeton University — Princeton, NJ
Assistant Professor of Politics and Public Affairs. July 1997–July 2001.

Teaching Interests

Quantitative methods
Elections & Direct democracy
California politics

Grants & Awards

Fellow, Society for Political Methodology, Elected 2019.

Research grant, "For Modernizing the VoteView Website And Software." Madison Initiative. William and Flora Hewlett Foundation (Grant #2016-3870). January 2016. $200k.

Conference/training grant, "Support for Conferences and Mentoring of Women and Underrepresented Groups in Political Methodology," National Science Foundation (NSF-SBE-1628102 with Kosuke Imai), $308k.

Research grant. "Collaborative Research on Dynamic Models of Roll Call Voting." National Science Foundation (NSF-SBS-0611974, with Keith Poole and Howard Rosenthal). July 2006. $394k total ($182k UCLA).

Brian P. Copenhaver Award for Innovation in Teaching with Technology, College of Letters and Sciences, University of California Los Angeles. 2007.

Warren Miller Prize for best article in volume 11 of *Political Analysis*. 2003 (article co-authored with Ken Schultz).

Research grant. "Empirical Testing of Crisis Bargaining Models." National Science Foundation (NSF-SBS-0241647, with Ken Schultz). February 2003. $200k.

Research grant, "Term limits in California." John Randolf and Dora Haynes Foundation, May 2000. $27k.

Research grant, Princeton University Committee on Research in the Humanities and Social Sciences, May 1998.

Harvard/MIT Research Training Group for Positive Political Economy Dissertation Fellowship, 1995-1996.

Sigma Xi Honorary Society, Wesleyan University, 1990.

White Prize for excellence in economics, Wesleyan University, 1990.

Ford Foundation Summer Research Fellowship, Wesleyan University, 1988.

Publications

"The new Voteview.com: preserving and continuing Keith Poole?s infrastructure for scholars, students and observers of Congress," *Public Choice*. 2018, 176:17–32 (with Adam Boche, Aaron Rudkin, and Luke Sonnet).

"Recovering a Basic Space from Issue Scales in R." *Journal of Statistical Software*. 2016, 69(7) (Keith T. Poole, Howard Rosenthal, James Lo, Royce Carroll).

"The Structure of Utility in Spatial Models of Voting," *American Journal of Political Science*. 2013, 56(4):1008–1028 (with Royce Carroll, James Lo, Keith T. Poole, and Howard Rosenthal).

"Economic Crisis, Iraq, and Race: A Study of the 2008 Presidential Election." (*Election Law Journal*. 2010, 9(1): 41–62 (with Michael Herron and Seth Hill).

"Comparing NOMINATE and IDEAL: Points of difference and Monte Carlo tests." *Legislative Studies Quarterly*. 2009, 34:555–592 (with Royce Carroll, James Lo, Keith T. Poole, and Howard Rosenthal).

"Measuring Bias and Uncertainty in DW-NOMINATE Ideal Point Estimates via the Parametric Bootstrap", *Political Analysis.* 2009, 17(3):261–275 (with Royce Carrol, James Lo, Keith T. Poole, and Howard Rosenthal).

"poLCA: An R Package for Polytomous Variable Latent Class Analysis." *Journal of Statistical Software.* 2011, 42(10) (with Drew A. Linzer).

"Scaling Roll Call Votes with Wnominate in R." *Journal of Statistical Software.* 2011, 42(14) (with Keith Poole, James Lo, and Royce Carroll).

"Ballot Formats, Touchscreens, and Undervotes: A Study of the 2006 Midterm Elections in Florida." *Election Law Journal.* 2008. 7(1):25–47 (with Laurin Frisana, Michael C. Herron, and James Honaker).

"An Estimate of Risk Aversion in the U.S. Electorate." *Quarterly Journal of Political Science.* 2007, 2(2):139–154. (with Adam J. Berinsky).

"Ideological Adaptation? The Survival Instinct of Threatened Legislators." *Journal of Politics.* 2007, 69(3):823–843 (with Thad Kousser and Seth Masket).

"Did Ralph Nader Spoil a Gore Presidency? A Ballot-Level Study of Green and Reform Party Voters in the 2000 Presidential Election." *Quarterly Journal of Political Science.* 2007, 2(3):205–226 (with Michael Herron).

"A Return to Normalcy? Revisiting the Effects of Term Limits on Competitiveness and Spending in California Assembly Elections" *State Politics and Policy Quarterly.* 2007, 7(1):20–38 (with Seth Masket).

"Learning about Learning: A Response to Wand." *Political Analysis.* 2006, 14: 121-129 (with Kenneth Schultz).

"Estimating Regression Models in Which the Dependent Variable Is Based on Estimates" *Political Analysis.* 2005, 13(4) (with Drew A. Linzer)

"Beyond the Median: Voter Preferences, District Heterogeneity, and Representation." *Journal of Political Economy.* 2004, 106(6):1364–1383 (with Liz Gerber).

"Measuring Bias and Uncertainty in Ideal Point Estimates via the Parametric Bootstrap." *Political Analysis.* Spring 2004. 12:105–127 (with Keith Poole)

"Extending King's Ecological Inference Model to Multiple Elections using Markov Chain Monte Carlo," Chapter in Gary King, Ori Rosen, and Martin Tanner, Eds. *Ecological Inference: New Methodological Strategies.* Cambridge: Cambridge University Press. 2004.

"Revealing Preferences: Empirical Estimation of a Crisis Bargaining Game with Incomplete Information." *Political Analysis.* 2003, 11(4):345–365 (with Kenneth A. Schultz).

"Understanding King's Ecological Inference Model: A Method-of-moments Approach," *Historical Methods.* 2001, 34(4):170–188.

"Estimating Voter Preference Distributions from Individual-Level Voting Data," *Political Analysis.* 2001, 9(3):275-297.

"No Evidence on Directional vs. Proximity Voting," *Political Analysis.* 1999, 8(1):21-33 (with Gary King).

"Reevaluating the Effect of N-Ach (Need for Achievement) on Economic Growth," *World Development.* 1991, 19(9):1269–1274.

Other Publications

Comment on "McCue, K. F. (2001), 'The Statistical Foundations of the EI method, *The American Statistician.* 2002, 55(3):250.

"Veteran's Adjustment." Chapter in *After the Cold War: Living with Lower Defense Spending*, Congress of the United States, Office of Technology Assessment, OTA-ITE-524. 1992.

Working Papers

Has Joint Scaling Solved the Achen Objection to Miller and Stokes? (with Christopher Tausanovitch, under revision).

Residual Votes in the 2008 Minnesota Senate Race (with Jonathan W. Chipman and Michael C. Herron)

From Punchcards to Touchscreens: Some Evidence from Pasco County, Florida on the Effects of Changing Voting Technology (with Michael C. Herron)

Voting in Low Information Elections: Bundling and Non-Independence of Voter Choice (with Liz Gerber, April 2002)

Dangers of Measurement Error in Non-linear Models: The Case of Directional versus Proximity Voting (April 2002)

A Reply to McCue's Reply to My Comment on "The Statistical Foundations of the EI method"

PhD Students

Committees Chaired or Co-chaired: Ryan Enos (Harvard), Seth Hill (UCSD), James Lo (USC), stonegarden grindlife.
Currently charing or co-chairing five committees.
Committee member on over 35 PhD students (including as an outsider member in Economics and Statistics).

Conference Presentations

American Political Science Association, Philadelphia, September 2016.
Annual Meetings of the Midwest Political Science Association, Chicago, April 2014.
Annual Meetings of the Midwest Political Science Association, Chicago, April 2011.
Summer Meetings of the Political Methodology Society, New Haven, 2009

Annual Meetings of the Midwest Political Science Association, Chicago, April 2006.
American Political Science Association, Chicago, September 2004.
American Political Science Association, Philadelphia, September 2003.
Annual Meetings of the Midwest Political Science Association, Chicago, April 2003.
Summer Meeting of the Political Methodology Society, Seattle, 2002
Annual Meetings of the Public Choice Society, Houston, San Diego, 2002.
Annual Meetings of the Midwest Political Science Association, Chicago, April 2002.
Annual Meetings of the Midwest Political Science Association, Chicago, April 2001.
Annual Meetings of the Midwest Political Science Association, Chicago, April 2000.
Summer Meeting of the Political Methodology Society, College Station Texas, 1999.
Annual Meetings of the Social Science History Association, Chicago, November 1998.
American Political Science Association, Boston, September 1998.
Annual Meetings of the Midwest Political Science Association, Chicago, April 1997.
Annual Meetings of the American Political Science Association, San Francisco,August 1996.
Annual Meetings of the Public Choice Society, Houston, April 1996.
American Political Science Association, Atlanta, August 1989.

Software

Voteview: US Roll call votes and legislator ideologies, 1789–2021: Provides interactive search and visualization of every roll call vote ever taken in the United States Congress. See `https://voteview.com`.

WNominate (v1.2): R package implementing Poole and Rosenthal's W-Nominate estimator co-authored with Keith Poole and James Lo. (`http://cran.r-project.org/web/packages/wnominate/index.html`)

PoLCA (v1.4.1): R package for Polytomous Variable Latent Class Analysis. Co-authored with Drew Linzer. (`http://dlinzer.github.io/poLCA/`)

Data collections

US Congressional roll call voting and related data, 1789–2021: Provides data on every roll call vote ever taken in the United States Congress. See `https://voteview.com`.

US Congressional District Boundaries, 1789–2017. Detailed GIS descriptions of every district in US history (with Brandon DeVine (UCLA), Lincoln Pritcher (UCLA), and Ken Martis (UWV)). See `http://cdmaps.polisci.ucla.edu/`.

109th – 114th Congress Data Project. UCLA. Webpage allows download of up to the hour roll call voting matrices for the current US Congress [Now included in the Voteview project].

California Roll Call Project. UCLA. Collection of roll call voting data from the California Assembly from 1850 to the present. Ongoing (with Seth Masket).

Crisis Bargaining Data Base. UCLA. Codings of post-World War I international crises outcomes in terms of a simple game theoretic model of coercive diplomacy (supported by NSF-SBS-0241647) (with Ken Schultz).

Record of American Democracy Project Harvard University. One of several project leaders. Summer 1995.

University Service

Chair: Executive Committee, Faculty of Letters and Science, UCLA (September 2019–Present)

Vice Chair: Executive Committee, Faculty of Letters and Science, UCLA (2018–2019)

Member: Executive Committee, Faculty of Letters and Science, UCLA (2017–2018); Council on Academic Planning and Budget, UCLA (2019–Present); Classroom Advisory Committee, UCLA (2018–2020); Pathways to Commencement Task Force, UCLA (2013–2014).

Professional Experience

President: Society for Political Methodology (2015–2017).

Vice President/President elect: Society for Political Methodology (2013–2015).

Co-editor: *The American Political Science Review* July 2008–July 2011; *The Political Methodologist*, the APSA Methodology section newsletter. 2004–2007 (with Adam Berinsky and Michael Herron).

Editorial Board Member: *Journal of Politics*, 2005–2008; *Political Analysis* 2005–present.

Panelist: National Science Foundation ad hoc peer review panels (June 2004, February 2008, October 2010); National Science Foundation Political Science Panel (2009–2010).

Departmental review visiting committee member: University of Colorado, 2013; London School of Economics, 2015; University of Michigan, 2015.

Nominations committee member: American Political Science Association, 2011–12, 2012–13.

Program committee member: American Political Science Association Annual Meetings 2003, Political Methodology division head.

Anonymous Referee: *American Political Science Review*, *American Journal of Political Science*, *Journal of Law and Economics*, *World Politics*, *Political Analysis*, *Legislative Studies Quarterly*, *Sociological Methods Review*, *Journal of Politics*, *Journal of Theoretical Politics*, and *Political Behavior*, *Perspectives on Politics*, *Public Opinion Quarterly*, *Journal of Political Economy.*

Discussant/Panel Chair Political Methodology Conference (1997, 2004, 2005, 2015), Midwest Political Science Association meetings (1998, 2005, 2006). American Political Science Association meetings (1998, 2002, 2003, 2006, 2010, 2016). Public Choice Society (1996, 2002)

Work Experience

Polimetrix — Palo Alto, CA
Director of Statistics, 2003–2007.

Office of Technology Assessment, U.S. Congress — Washington, DC
Research Analyst, Industry Technology and Employment program. October 1990 – August 1992.

Selected Invited Lectures

American Politics Seminar, Political Science Department, Columbia University, 1998

Political Economy Seminar, Political Science Department, Michigan University, 1999

Political Economy Seminar, Graduate School of Business, Stanford University, 1999

Political Economy Seminar, Politics & Economics Departments, Princeton University, 1998

Southern California Methods Program, UC Riverside, November 2001.

Ideal-Point Estimation Conference, Washington University St. Louis, September 2002.

American Politics Seminar, Political Science Department, Yale University, 2003.

Political Economy Seminar, Politics & Economics Departments, Princeton University, Spring 2004.

Political Economy Seminar, Politics Department, Massachusetts Institute of Technology, Spring 2004.

Empirical Implications of Theoretical Models Program, Washington University, St. Louis, June 2004.

Multilevel Methods Conference, Center for the Study of Democratic Politics, Woodrow Wilson School of Public and International Affairs, Princeton University, October 2004.

Empirical Implications of Theoretical Models Program, University of California Berkeley (one week module co-taught with Kenneth A. Schultz). June 2005.

Roll Call Voting Conference, Department of Political Science, University of California, San Diego. May 2006.

Measures of Legislators' Policy Preferences and the Dimensionality of Policy Spaces Conference Department of Political Science, Washington University, St. Louis. November 2007.

Causal Inference. Business School. University of Southern California. June 2010.

How to Scrape Web Pages. Summer Methods Program. Department of Sociology. Stanford University, July 2010, 2011, 2012, 2013, 2014, 2015.

Lectures on Ecological Inference. Summer Methods Training Program, Academia Senica, Taipei, Taiwan. July 2010.

Applied Statistics Workshop. Department of Government. Harvard University, April 2011.

Methods Workshop. Department of Political Science, Stanford University. June 2011.

Conference on "Political Representation: Fifty Years After Miller & Stokes." Vanderbilt University, March 2013

Center for the Study of Democratic Politics (CSDP) Workshop, Princeton University, April 2015.

Ideal Point Models in Political Science Workshop, MIT, April 2015.

Interdisciplinary Seminar in Quantitative Methods (ISQM) Workshop, University of Michigan, September 2015.

Political Economy Seminar, Graduate School of Business, Stanford University, April 2019,

Exhibit B

Table 1: General Elections

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
CD20-001	41.9	17	100	2.0	100	56	39	100	24	35
CD20-002	18.2	35	100	2.0	43	49	14	100	41	15
CD20-003	18.7	18	100	2.0	0	38	18	99	24	35
CD20-004	24.4	17	100	2.0	100	68	22	94	40	19
CD20-005	10.7	16	100	2.0	0	34	10	100	25	33
CD20-006	32.0	17	100	2.0	100	60	30	100	42	14
CD20-007	15.4	17	100	2.0	0	42	13	93	33	29
CD20-008	25.9	19	100	2.0	11	48	29	100	27	32
CD20-009	17.4	18	100	2.0	0	44	15	100	32	27
CD20-010	10.1	17	100	2.0	0	32	11	100	26	33
CD20-012	34.1	22	100	1.9	100	72	39	100	54	6
CD20-013	13.9	17	100	2.0	0	33	12	100	23	35
CD21-001	22.4	19	100	2.0	0	39	19	97	25	35
CD21-002	39.1	16	100	2.0	94	55	35	100	25	33
CD21-003	15.7	17	100	2.0	0	43	14	95	33	27
CD21-004	27.5	16	100	2.0	38	49	34	100	27	31
CD21-005	23.2	35	100	2.0	46	50	18	100	39	17
CD21-006	20.4	17	100	2.0	100	66	17	100	42	13
CD21-007	15.3	17	100	2.0	0	39	13	100	27	31
CD21-008	16.5	17	100	2.0	0	40	14	100	29	30
CD21-009	36.3	22	100	1.9	100	75	42	100	58	2
CD21-010	16.2	16	100	2.0	0	35	12	100	24	34
CD21-011	19.2	16	100	2.0	0	37	16	100	27	31
CD21-012	17.1	16	100	2.0	0	43	18	100	33	25
CD21-013	14.8	16	100	2.0	0	38	14	100	29	30
LD20-001	36.6	19	100	2.0	21	48	28	100	20	37
LD20-002	25.7	20	100	2.0	5	43	25	100	25	33
LD20-003	19.2	24	100	2.0	4	41	19	98	28	31
LD20-004	20.6	20	100	2.0	0	38	17	100	17	39

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-005	41.0	20	100	2.0	100	56	34	100	20	37
LD20-006	7.1	21	100	2.0	0	36	7	84	28	43
LD20-007	22.4	27	100	2.0	15	46	24	100	29	29
LD20-008	42.5	23	100	2.0	65	54	35	100	30	31
LD20-009	27.9	23	100	2.0	9	45	21	100	31	31
LD20-010	22.0	20	100	2.0	0	37	21	100	17	40
LD20-011	15.4	37	100	2.0	89	57	13	100	50	5
LD20-012	36.9	23	100	2.0	39	49	38	100	18	39
LD20-013	7.9	11	100	2.0	0	30	9	95	22	39
LD20-014	17.8	14	100	2.0	0	40	19	100	26	33
LD20-015	10.7	14	100	2.0	0	32	12	100	22	36
LD20-016	18.3	22	100	2.0	0	37	17	95	25	36
LD20-017	10.1	33	100	2.0	0	37	10	88	31	33
LD20-018	21.1	24	100	1.9	100	66	21	100	56	5
LD20-019	6.3	8	100	2.0	0	39	6	100	35	22
LD20-020	5.5	1	100	1.0	100	100	3	.	.	.
LD20-021	37.4	22	100	2.0	36	47	32	99	23	36
LD20-022	29.3	19	100	2.0	11	45	29	100	19	38
LD20-023	50.6	19	100	2.0	100	62	37	100	18	39
LD20-024	38.2	21	100	2.0	95	55	36	100	26	32
LD20-025	42.6	13	100	2.0	15	43	34	100	18	39
LD20-026	16.5	25	100	2.0	0	32	11	100	24	34
LD20-027	51.6	23	100	1.9	100	67	45	100	29	35
LD20-028	15.8	23	100	2.0	0	29	10	100	21	37
LD20-029	37.2	26	100	1.8	100	82	40	100	70	0
LD20-030	28.2	19	100	1.9	100	60	25	100	47	12
LD20-031	39.8	24	100	1.8	100	80	48	100	62	1
LD20-032	48.1	25	100	1.9	100	67	50	100	35	29
LD20-033	39.9	36	100	2.0	100	64	37	100	43	12

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-034	11.5	36	100	2.0	19	43	6	100	39	16
LD20-035	18.0	37	57	2.0	43	45	11	66	43	31
LD20-036	7.5	14	50	2.0	50	52	6	65	52	16
LD20-037	11.3	36	100	2.0	0	36	9	100	30	28
LD20-038	39.4	43	100	1.9	100	77	42	98	62	2
LD20-040	11.3	38	100	2.0	8	40	7	100	35	22
LD20-041	7.1	13	92	2.0	46	50	6	88	47	8
LD20-042	38.1	25	100	1.9	100	71	49	100	40	24
LD20-043	33.9	23	100	2.0	30	50	29	100	30	32
LD20-044	48.1	26	100	1.9	100	75	54	100	45	19
LD20-045	31.4	26	100	2.0	65	52	32	99	30	32
LD20-046	25.0	21	100	2.0	29	45	27	98	25	33
LD20-047	23.8	30	100	1.9	47	55	24	98	42	25
LD20-048	35.5	19	100	2.0	100	56	40	100	28	30
LD20-049	12.3	36	100	2.0	61	52	7	100	49	7
LD20-050	17.5	17	100	2.0	12	43	23	89	28	34
LD20-052	11.0	26	100	2.0	0	29	10	99	22	36
LD20-054	12.9	30	53	2.0	3	44	9	91	39	21
LD20-055	26.2	20	100	2.0	0	43	23	100	23	35
LD20-056	10.2	36	100	1.7	100	79	10	100	76	0
LD20-057	39.7	30	100	1.9	100	66	39	99	45	17
LD20-058	43.1	29	100	1.9	100	73	44	98	54	6
LD20-059	28.6	26	100	2.0	0	39	23	100	21	36
LD20-060	34.6	26	100	2.0	96	60	36	100	36	21
LD20-061	40.0	30	100	1.9	100	70	32	100	55	6
LD20-062	13.7	28	100	2.0	0	36	11	100	28	30
LD20-063	24.8	28	100	2.0	39	49	24	100	33	25
LD20-064	15.1	27	100	2.0	0	40	14	100	30	29
LD20-065	19.6	26	100	2.0	0	36	19	99	22	37

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-066	24.0	18	100	2.0	11	44	20	100	25	33
LD20-067	7.9	23	100	2.0	0	23	6	100	17	39
LD20-068	8.4	24	100	2.0	0	35	8	100	30	28
LD20-069	11.6	25	100	2.0	0	35	11	100	27	32
LD20-070	7.2	30	100	2.0	0	24	6	100	19	38
LD20-071	40.3	25	100	2.0	100	73	46	99	50	4
LD20-072	34.4	25	100	2.0	100	71	34	100	56	1
LD20-073	14.6	21	100	2.0	0	36	19	100	28	31
LD20-074	11.4	26	100	2.0	0	45	11	100	38	19
LD20-075	15.3	26	100	2.0	0	38	15	100	27	31
LD20-076	21.6	23	100	2.0	0	41	20	100	26	32
LD20-077	7.3	20	100	2.0	0	26	6	100	19	38
LD20-078	6.1	1	100	2.0	0	24	7	100	19	38
LD20-079	22.3	23	100	2.2	4	37	16	98	19	39
LD20-080	9.5	24	100	2.0	0	23	8	100	16	40
LD20-081	9.6	25	100	2.0	0	26	8	100	20	38
LD20-082	20.2	13	100	1.9	8	45	18	100	34	30
LD20-083	19.5	24	100	2.0	46	48	12	100	26	32
LD20-084	14.1	26	100	2.0	0	32	13	100	22	36
LD20-086	6.0	28	100	2.0	4	36	6	100	31	27
LD20-088	16.0	19	100	1.9	100	59	18	100	51	4
LD20-089	7.9	24	100	2.0	0	28	7	100	22	36
LD20-091	4.8	12	100	2.0	0	23	6	100	17	40
LD20-092	40.2	24	100	1.8	100	76	46	100	55	7
LD20-095	9.6	24	100	2.0	0	33	8	100	28	31
LD20-096	8.9	24	100	2.0	0	36	7	100	30	28
LD20-098	9.2	27	100	2.0	7	43	9	100	38	20
LD20-099	36.0	20	100	2.0	100	64	42	100	38	19
LD20-100	30.5	24	100	1.8	100	76	35	100	63	0

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-101	48.0	27	100	1.9	100	78	55	100	51	13
LD20-102	33.8	25	100	1.8	100	82	39	99	71	0
LD20-103	14.2	21	100	2.0	19	48	13	100	40	17
LD20-104	12.0	25	100	2.0	20	46	10	100	41	16
LD20-105	12.9	20	100	2.0	50	50	13	100	42	14
LD20-106	46.3	30	100	1.7	100	87	59	99	71	1
LD20-107	53.6	26	100	1.8	100	82	57	100	60	3
LD20-108	19.5	31	100	2.0	6	40	17	100	28	32
LD20-109	15.3	30	100	2.0	7	39	12	100	31	30
LD20-110	14.6	19	100	2.0	0	28	13	100	18	39
LD20-111	22.8	29	100	2.0	3	41	23	100	24	35
LD20-112	9.2	36	100	2.0	0	31	8	99	25	34
LD20-115	6.9	12	100	2.0	100	61	6	100	49	6
LD20-116	7.2	10	100	2.0	60	53	7	100	49	5
LD21-001	17.7	21	100	2.0	0	38	15	93	25	37
LD21-002	23.7	22	100	2.0	9	43	23	99	26	32
LD21-003	19.4	22	100	2.0	5	41	17	99	29	30
LD21-004	24.9	17	100	2.0	0	35	20	100	19	38
LD21-005	37.5	20	100	2.0	85	53	32	100	19	38
LD21-007	22.2	27	100	2.0	15	46	23	100	30	29
LD21-008	44.2	23	100	2.0	87	57	37	100	32	29
LD21-009	24.6	24	100	2.0	4	41	19	97	28	36
LD21-010	33.1	23	100	2.0	4	41	28	99	19	38
LD21-011	14.2	36	100	2.0	81	55	11	100	49	5
LD21-012	37.7	18	100	2.0	11	47	34	100	19	38
LD21-013	8.3	21	100	2.0	0	30	7	96	24	36
LD21-014	17.8	14	100	2.0	0	40	19	100	26	33
LD21-015	10.6	14	100	2.0	0	32	13	100	22	36
LD21-016	13.2	25	100	2.0	0	34	14	93	24	38

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-017	10.3	33	100	2.0	0	38	10	88	32	32
LD21-018	21.6	24	100	1.9	100	66	22	100	57	5
LD21-019	5.1	8	100	2.0	0	37	5	100	33	25
LD21-020	5.3	1	100	1.0	100	100	3	.	.	.
LD21-021	10.8	35	100	2.0	0	38	7	92	34	28
LD21-022	27.7	20	100	2.0	0	41	26	100	19	38
LD21-023	52.5	19	100	2.0	100	62	39	100	17	39
LD21-024	36.6	21	100	2.0	86	54	36	100	26	32
LD21-025	40.0	21	100	2.0	33	46	29	100	18	39
LD21-027	50.8	21	100	2.0	100	64	48	100	27	31
LD21-028	16.2	22	100	2.0	0	28	11	100	19	38
LD21-029	38.3	24	100	1.8	100	80	44	100	65	0
LD21-030	33.0	23	100	1.8	100	81	35	100	71	0
LD21-031	38.1	5	100	1.0	100	100	45	.	.	.
LD21-032	42.4	19	100	1.9	100	63	43	100	35	31
LD21-033	29.8	43	100	1.9	100	77	30	100	67	0
LD21-034	18.2	36	100	2.0	56	51	13	100	44	11
LD21-036	8.0	9	100	2.0	0	36	7	100	31	28
LD21-038	43.6	2	100	1.0	100	100	47	.	.	.
LD21-040	10.7	23	100	2.0	9	44	6	100	41	15
LD21-042	38.1	25	100	1.9	100	71	49	100	40	24
LD21-043	34.8	23	100	2.0	43	51	30	100	31	31
LD21-044	48.1	26	100	1.9	100	75	54	100	45	19
LD21-045	30.3	25	100	2.0	32	49	31	99	26	33
LD21-046	28.5	21	100	2.0	14	44	27	100	22	36
LD21-047	21.5	29	100	1.9	48	57	23	96	45	22
LD21-048	35.5	19	100	2.0	100	56	40	100	28	30
LD21-049	13.0	36	100	2.0	47	50	8	100	46	9
LD21-050	17.9	17	100	2.0	12	44	25	90	28	34

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-052	22.3	20	100	2.0	20	46	22	99	24	34
LD21-054	11.1	31	58	2.0	6	44	10	86	39	23
LD21-055	24.0	20	100	2.0	0	42	21	100	24	34
LD21-056	10.1	36	100	1.7	100	79	10	100	76	0
LD21-057	39.7	30	100	1.9	100	66	39	99	45	17
LD21-058	42.8	29	100	1.9	100	72	44	99	52	8
LD21-059	26.6	26	100	2.0	0	37	20	100	21	36
LD21-060	34.9	26	100	2.0	100	61	37	100	37	20
LD21-061	40.8	30	100	1.9	100	70	34	100	55	6
LD21-062	13.3	28	100	2.0	0	35	10	100	28	30
LD21-063	24.3	29	100	2.0	24	48	22	100	34	25
LD21-064	15.5	28	100	2.0	0	40	14	100	30	29
LD21-065	18.9	26	100	2.0	0	36	19	99	22	36
LD21-066	27.2	35	100	2.0	66	53	22	100	39	17
LD21-067	13.0	21	100	2.0	0	31	13	100	21	36
LD21-068	8.1	24	100	2.0	0	35	7	100	30	28
LD21-069	11.6	21	100	2.0	0	33	10	100	26	33
LD21-070	7.0	30	100	2.0	0	24	6	100	19	38
LD21-071	39.5	24	100	2.0	100	71	45	98	49	4
LD21-072	33.7	24	100	2.0	100	69	32	100	54	1
LD21-073	17.0	13	100	2.0	0	40	12	100	26	33
LD21-074	11.3	26	100	2.0	0	43	10	100	36	22
LD21-075	15.3	26	100	2.0	0	38	15	100	27	31
LD21-076	20.4	24	100	2.0	0	39	19	100	25	33
LD21-077	5.5	19	100	2.0	0	26	6	100	19	38
LD21-078	5.5	1	100	2.0	0	26	5	92	23	39
LD21-079	16.9	21	100	2.0	0	38	12	90	27	37
LD21-080	9.4	24	100	2.0	0	24	9	100	17	40
LD21-081	9.6	25	100	2.0	0	26	9	100	20	38

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-082	21.0	25	100	2.0	4	39	16	100	28	34
LD21-083	11.9	18	100	2.0	0	28	8	100	22	36
LD21-084	16.0	26	100	2.0	0	34	15	100	23	35
LD21-086	6.1	28	100	2.0	4	35	6	100	31	28
LD21-088	23.3	19	100	1.9	100	64	23	100	53	5
LD21-089	6.7	24	100	2.0	0	26	6	100	21	36
LD21-091	14.1	19	100	2.0	0	37	19	100	31	28
LD21-092	39.1	24	100	1.8	100	74	44	100	54	10
LD21-095	7.6	24	100	2.0	0	32	5	100	28	30
LD21-096	9.9	25	100	2.0	0	36	9	100	30	28
LD21-098	7.5	27	100	2.0	0	41	7	100	37	20
LD21-099	46.8	28	100	1.8	100	82	57	100	59	2
LD21-100	31.0	24	100	1.8	100	76	35	100	63	0
LD21-101	46.8	26	100	1.8	100	76	52	100	51	13
LD21-102	37.6	26	100	1.8	100	84	44	99	73	0
LD21-103	11.8	22	100	2.0	0	43	12	99	35	23
LD21-104	8.5	26	100	2.0	0	45	7	100	41	15
LD21-105	12.2	24	100	2.0	42	49	13	100	42	13
LD21-106	43.4	27	100	1.8	100	83	54	99	64	1
LD21-107	47.4	23	100	1.8	100	77	49	100	55	9
LD21-108	19.3	30	100	2.0	3	38	16	100	26	32
LD21-109	16.8	17	100	1.9	6	42	14	100	33	31
LD21-110	15.7	19	100	2.0	0	34	19	100	19	38
LD21-111	16.4	19	100	2.0	0	31	14	100	20	38
LD21-112	27.8	22	100	1.9	100	74	37	100	59	1
LD21-113	6.8	18	100	2.0	0	33	6	96	27	33
LD21-114	7.6	13	100	1.9	100	67	7	100	66	0
LD21-115	6.3	7	100	2.0	29	49	5	100	46	7
SD20-001	24.6	20	100	2.0	0	45	19	96	25	34

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD20-002	14.1	21	100	2.0	0	35	15	99	25	34
SD20-003	42.2	18	100	2.0	100	55	42	100	23	35
SD20-004	46.5	19	100	2.0	100	60	40	100	24	35
SD20-005	34.8	20	100	2.0	100	54	29	100	26	32
SD20-006	14.5	22	100	2.0	0	34	16	98	21	38
SD20-007	33.6	19	100	2.0	5	47	36	100	20	38
SD20-008	12.6	18	100	2.0	0	38	11	86	31	34
SD20-009	12.0	22	100	1.9	64	57	10	100	52	8
SD20-010	20.1	20	100	2.0	0	39	20	100	18	39
SD20-011	27.5	20	100	2.0	25	48	22	100	22	35
SD20-012	18.8	22	100	2.0	0	42	16	100	24	34
SD20-013	25.1	20	100	2.0	40	47	25	99	27	31
SD20-014	32.1	37	100	2.0	100	65	31	100	49	6
SD20-015	18.1	35	100	2.0	37	45	12	100	38	19
SD20-016	12.9	37	100	2.0	46	50	9	100	45	10
SD20-017	8.8	36	100	2.0	0	39	7	90	35	27
SD20-018	24.4	20	100	2.0	5	44	22	100	28	30
SD20-019	33.6	22	100	2.0	77	53	32	100	32	30
SD20-020	35.4	24	100	1.8	100	78	40	100	64	1
SD20-021	41.2	20	100	2.0	100	67	50	100	34	24
SD20-022	30.0	16	100	2.0	38	49	27	100	29	29
SD20-023	11.1	25	56	1.9	56	56	10	82	52	14
SD20-024	22.0	22	100	2.0	0	44	20	100	31	28
SD20-025	23.4	19	100	2.0	5	43	24	100	23	35
SD20-026	12.6	25	100	2.0	0	26	8	100	19	38
SD20-027	24.0	26	100	2.0	23	44	20	100	30	28
SD20-028	43.9	28	100	1.9	100	72	42	100	53	8
SD20-029	10.5	22	100	2.0	0	28	9	100	19	39
SD20-030	14.7	19	100	2.0	0	33	17	99	21	37

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD20-031	22.0	19	100	2.0	5	45	23	100	30	29
SD20-032	23.9	23	100	2.0	96	57	23	100	45	10
SD20-033	14.4	18	100	2.0	0	31	12	100	22	36
SD20-034	10.1	21	100	2.0	0	31	10	100	25	33
SD20-035	12.2	22	100	2.0	0	36	12	100	28	31
SD20-036	17.9	24	100	2.0	0	41	12	100	24	34
SD20-037	13.8	17	100	2.0	65	50	12	100	43	11
SD20-038	42.8	26	100	1.8	100	82	50	99	65	0
SD20-039	21.3	18	100	2.0	100	57	24	100	44	11
SD20-040	38.7	24	100	1.8	100	77	48	100	56	6
SD20-041	29.1	21	100	2.0	100	58	30	100	40	16
SD20-042	7.9	18	100	2.0	0	31	6	100	26	33
SD20-043	17.4	29	100	2.0	7	38	15	100	28	33
SD20-044	13.1	22	100	2.0	0	32	16	100	21	37
SD20-046	5.5	1	100	2.0	0	28	5	100	26	32
SD20-049	6.4	11	100	2.0	100	61	6	100	53	2
SD21-001	28.8	18	100	2.0	22	47	20	96	24	35
SD21-002	29.3	16	100	2.0	12	46	23	100	26	32
SD21-003	25.9	18	100	2.0	0	43	26	100	23	35
SD21-004	34.1	17	100	2.0	35	49	33	100	23	35
SD21-005	39.3	19	100	2.0	100	57	31	100	26	33
SD21-006	13.8	22	100	2.0	0	32	15	99	20	38
SD21-007	11.5	22	100	1.9	64	57	10	100	52	8
SD21-008	13.9	17	100	2.0	0	38	11	85	31	35
SD21-009	23.1	16	100	2.0	0	38	20	99	23	36
SD21-010	15.9	22	100	2.0	0	38	10	100	21	36
SD21-011	35.7	17	100	2.0	71	52	32	100	27	31
SD21-012	19.6	22	100	2.0	0	42	16	100	24	34
SD21-013	20.5	18	100	2.0	0	43	22	99	28	31

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-014	41.5	35	100	2.0	100	63	39	100	39	17
SD21-015	13.9	36	100	2.0	67	54	9	100	50	6
SD21-016	8.1	36	100	2.0	33	46	6	100	43	12
SD21-017	10.1	36	100	2.0	0	36	8	99	31	28
SD21-018	21.5	36	100	2.0	53	51	16	100	41	14
SD21-019	45.0	24	100	1.9	100	70	46	100	44	23
SD21-020	26.2	21	81	2.0	81	55	16	88	48	8
SD21-021	18.3	18	100	2.0	0	39	21	99	23	35
SD21-022	33.2	18	100	2.0	100	62	30	100	46	9
SD21-023	16.0	16	100	2.0	100	65	24	84	35	26
SD21-024	28.4	17	100	2.0	59	53	31	98	30	29
SD21-025	17.1	22	100	2.0	5	40	16	100	29	30
SD21-026	16.8	22	100	2.0	0	34	16	100	22	36
SD21-027	26.2	25	100	2.0	68	52	22	99	39	18
SD21-028	49.5	26	100	1.9	100	74	50	99	50	11
SD21-029	17.3	16	100	2.0	0	35	13	100	21	37
SD21-030	8.8	18	100	2.0	0	25	7	100	19	38
SD21-031	11.5	20	100	2.0	0	37	12	100	29	29
SD21-032	33.8	24	100	2.0	100	68	35	99	51	2
SD21-033	14.4	18	100	2.0	0	32	13	100	22	36
SD21-034	18.9	24	100	2.0	21	45	13	100	25	33
SD21-035	11.1	22	100	2.0	0	35	10	100	28	31
SD21-037	10.7	22	100	2.0	0	33	10	100	26	32
SD21-038	33.4	19	100	2.0	100	62	35	100	42	13
SD21-039	39.0	23	100	1.8	100	76	48	100	55	8
SD21-040	47.5	25	100	1.8	100	86	59	97	69	0
SD21-041	10.0	20	100	2.0	0	44	9	100	38	19
SD21-042	20.3	18	100	1.9	100	62	20	100	53	2
SD21-043	17.9	29	100	2.0	7	39	15	100	28	32

Table 1: General Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-044	12.7	22	100	2.0	0	33	15	100	20	37
SD21-045	7.1	21	100	2.0	0	31	7	100	26	32
SD21-049	6.9	12	100	1.9	100	65	6	100	54	1

Table 2: Primary Elections

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
CD20-001	41.9	17	100	4.0	100	61	62	69	47	10
CD20-002	18.2	22	100	3.6	68	56	25	69	52	16
CD20-003	18.7	18	100	3.9	78	55	40	66	48	19
CD20-004	24.4	20	100	3.8	80	61	33	67	57	9
CD20-005	10.7	19	100	3.8	58	52	22	64	48	14
CD20-006	32.0	18	100	4.1	72	53	47	60	46	19
CD20-007	15.4	20	100	3.8	80	53	29	63	50	4
CD20-008	25.9	17	100	4.0	76	54	52	60	48	17
CD20-009	17.4	20	100	4.3	60	50	32	64	45	10
CD20-010	10.1	18	100	3.9	72	52	25	62	49	24
CD20-011	3.7	2	100	3.5	50	50	5	82	46	26
CD20-012	34.1	23	100	3.6	87	61	54	69	51	17
CD20-013	13.9	18	100	3.9	78	56	33	61	53	11
CD21-001	22.4	18	100	3.9	78	55	42	66	48	16
CD21-002	39.1	17	100	4.0	100	61	60	70	47	11
CD21-003	15.7	22	100	3.7	68	53	27	66	46	11
CD21-004	27.5	17	100	4.0	71	54	55	61	47	17
CD21-005	23.2	21	100	3.6	71	58	32	69	54	16
CD21-006	20.4	18	100	4.3	61	50	24	74	45	19
CD21-007	15.3	18	100	3.9	67	52	31	62	48	22
CD21-008	16.5	18	100	3.9	72	52	35	63	46	22
CD21-009	36.3	23	100	3.6	83	61	55	69	51	17
CD21-010	16.2	18	100	3.9	78	53	35	62	48	22
CD21-011	19.2	17	100	4.0	71	53	35	64	47	20
CD21-012	17.1	19	100	3.8	74	53	36	63	48	18
CD21-013	14.8	20	100	3.9	80	54	31	65	49	10
CD21-014	3.6	2	100	3.5	50	50	5	82	46	26
LD20-001	36.6	18	100	3.9	89	57	57	73	38	17
LD20-002	25.7	18	100	3.9	89	58	46	71	47	10

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-003	19.2	22	100	3.6	64	54	41	66	44	22
LD20-004	20.6	18	100	3.9	89	58	52	70	45	10
LD20-005	41.0	20	100	3.7	95	61	61	69	47	15
LD20-006	7.1	16	100	4.1	75	52	15	64	51	6
LD20-007	22.4	23	100	3.5	96	66	49	81	52	2
LD20-008	42.5	19	100	3.8	95	60	59	67	49	12
LD20-009	27.9	19	100	3.8	79	58	38	67	52	8
LD20-010	22.0	17	100	4.0	76	54	44	72	36	15
LD20-011	15.4	22	100	3.6	50	47	15	70	42	25
LD20-012	36.9	18	100	3.9	89	60	61	67	48	5
LD20-013	7.9	17	100	4.0	65	52	22	66	47	9
LD20-014	17.8	16	100	4.1	94	56	47	62	51	11
LD20-015	10.7	16	100	4.1	75	52	38	62	46	8
LD20-016	18.3	19	100	3.8	79	52	39	61	46	4
LD20-017	10.1	22	100	3.6	73	55	25	64	51	12
LD20-018	21.1	19	100	3.8	79	56	35	62	53	11
LD20-019	6.3	20	100	3.8	55	51	10	64	49	10
LD20-020	5.5	15	100	4.1	60	54	8	77	52	5
LD20-021	37.4	23	100	3.6	87	56	63	62	45	15
LD20-022	29.3	23	100	3.7	91	58	56	70	43	7
LD20-023	50.6	21	100	3.8	86	61	66	67	46	11
LD20-024	38.2	19	100	3.8	95	63	63	68	52	10
LD20-025	42.6	12	100	4.2	92	57	69	63	46	10
LD20-026	16.5	19	100	3.8	63	53	35	66	46	24
LD20-027	51.6	23	100	3.6	78	57	59	71	37	30
LD20-028	15.8	19	100	3.8	95	56	35	65	51	7
LD20-029	37.2	24	100	3.6	67	61	37	78	50	12
LD20-030	28.2	23	100	3.6	70	59	32	73	52	13
LD20-031	39.8	24	100	3.6	92	63	57	73	49	14

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-032	48.1	20	100	3.7	100	68	65	78	51	8
LD20-033	39.9	23	100	3.6	83	62	58	74	48	16
LD20-034	11.5	22	100	3.6	32	42	12	73	38	39
LD20-035	18.0	24	100	3.5	71	58	31	67	55	18
LD20-036	7.5	24	100	3.5	58	52	13	62	50	13
LD20-037	11.3	23	100	3.6	57	52	23	63	49	13
LD20-038	39.4	22	100	3.5	77	60	52	68	53	22
LD20-040	11.3	21	100	3.6	43	47	17	70	42	25
LD20-041	7.1	22	100	3.6	41	46	11	73	43	23
LD20-042	38.1	10	100	3.0	90	61	76	67	42	12
LD20-043	33.9	19	100	3.9	79	52	51	59	46	26
LD20-044	48.1	19	100	3.9	84	56	76	60	44	32
LD20-045	31.4	20	100	3.9	75	54	60	62	43	25
LD20-046	25.0	18	100	4.0	89	52	41	61	46	11
LD20-047	23.8	24	100	3.7	75	51	23	68	46	8
LD20-048	35.5	22	100	3.7	91	58	63	67	44	16
LD20-049	12.3	22	100	3.6	32	42	10	68	39	37
LD20-050	17.5	20	100	3.8	60	51	28	61	48	13
LD20-052	11.0	18	100	3.9	72	56	26	62	54	9
LD20-054	12.9	18	100	3.9	67	55	18	63	54	0
LD20-055	26.2	20	100	4.1	75	52	51	74	35	21
LD20-056	10.2	22	100	3.8	36	42	8	77	40	29
LD20-057	39.7	20	100	3.9	80	56	56	63	46	18
LD20-058	43.1	21	100	3.8	76	55	60	62	46	25
LD20-059	28.6	21	100	3.9	76	55	60	64	41	19
LD20-060	34.6	20	100	3.9	85	58	60	64	48	12
LD20-061	40.0	20	100	3.9	70	54	35	63	49	17
LD20-062	13.7	21	100	3.8	67	51	27	64	46	9
LD20-063	24.8	20	100	3.8	80	55	43	62	49	13

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-064	15.1	20	100	3.9	65	52	30	60	48	24
LD20-065	19.6	18	100	3.9	89	56	44	66	49	16
LD20-066	24.0	18	100	4.1	78	52	42	63	43	10
LD20-067	7.9	18	100	3.9	61	50	22	70	44	13
LD20-068	8.4	19	100	4.1	84	57	25	65	54	4
LD20-069	11.6	19	100	3.9	79	54	31	64	49	5
LD20-070	7.2	18	100	3.9	83	56	19	67	53	16
LD20-071	40.3	23	100	3.7	87	58	62	63	50	14
LD20-072	34.4	23	100	3.7	70	54	40	65	46	20
LD20-073	14.6	18	100	4.0	72	51	36	64	44	21
LD20-074	11.4	19	100	3.9	63	50	23	64	46	8
LD20-075	15.3	20	100	3.8	75	52	37	65	44	24
LD20-076	21.6	19	100	3.8	95	56	42	61	53	19
LD20-077	7.3	19	100	3.9	79	54	23	62	51	8
LD20-078	6.1	18	100	3.9	67	53	19	62	51	12
LD20-079	22.3	19	100	4.1	84	55	41	68	46	13
LD20-080	9.5	18	100	3.9	83	56	26	63	53	16
LD20-081	9.6	18	100	3.9	78	56	24	62	54	9
LD20-082	20.2	10	100	2.8	100	61	42	70	55	7
LD20-083	19.5	18	100	3.9	78	53	37	64	46	25
LD20-084	14.1	18	100	3.9	89	52	31	64	47	9
LD20-086	6.0	20	100	3.7	65	54	14	66	52	16
LD20-087	5.1	19	100	3.8	74	52	13	66	49	11
LD20-088	16.0	14	100	4.3	64	55	24	67	51	13
LD20-089	7.9	17	100	4.0	88	55	23	61	54	1
LD20-090	3.3	17	100	3.9	53	47	8	70	45	19
LD20-091	4.8	19	100	3.8	63	53	13	65	50	29
LD20-092	40.2	21	100	3.6	81	60	64	67	48	12
LD20-094	5.7	23	100	3.8	52	46	12	58	44	14

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-095	9.6	18	100	3.9	67	51	22	61	48	11
LD20-096	8.9	17	100	4.0	71	50	17	59	48	16
LD20-097	5.5	18	100	3.9	61	55	15	67	52	8
LD20-098	9.2	18	100	3.9	56	54	18	63	52	21
LD20-099	36.0	23	100	3.6	87	62	65	70	47	15
LD20-100	30.5	20	100	3.7	80	57	41	66	51	19
LD20-101	48.0	21	100	3.6	90	62	72	69	44	19
LD20-102	33.8	19	100	4.2	84	59	46	68	52	15
LD20-103	14.2	18	100	3.9	67	53	24	64	49	21
LD20-104	12.0	17	100	3.9	53	46	15	66	43	33
LD20-105	12.9	18	100	4.1	78	55	24	65	52	9
LD20-106	46.3	26	100	3.7	100	64	72	72	44	12
LD20-107	53.6	24	100	3.6	96	64	72	72	44	12
LD20-108	19.5	19	100	3.8	74	53	41	69	43	14
LD20-109	15.3	20	100	3.7	75	53	30	62	49	8
LD20-110	14.6	19	100	3.8	84	53	37	64	47	12
LD20-111	22.8	21	100	3.8	90	57	46	71	45	9
LD20-112	9.2	20	100	3.8	70	51	19	66	47	11
LD20-115	6.9	17	100	4.2	59	54	7	66	54	13
LD20-116	7.2	20	100	4.0	65	56	8	63	55	18
LD20-117	3.6	22	100	3.7	59	51	5	67	50	4
LD21-001	17.7	17	100	4.0	100	56	35	70	49	9
LD21-002	23.7	18	100	3.9	72	56	37	63	52	22
LD21-003	19.4	21	100	3.7	62	52	35	68	43	22
LD21-004	24.9	18	100	4.0	83	56	53	66	45	7
LD21-005	37.5	19	100	3.8	95	59	60	68	45	20
LD21-007	22.2	23	100	3.5	96	66	48	81	52	3
LD21-008	44.2	19	100	3.8	95	60	59	67	48	10
LD21-009	24.6	17	100	4.0	71	56	39	61	52	16

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-010	33.1	18	100	3.9	94	57	58	65	47	16
LD21-011	14.2	22	100	3.6	45	46	14	71	42	31
LD21-012	37.7	17	100	4.0	94	59	60	68	46	6
LD21-013	8.3	18	100	3.9	72	54	19	66	50	14
LD21-014	17.8	16	100	4.1	94	56	47	62	51	11
LD21-015	10.6	17	100	4.1	71	51	39	60	45	6
LD21-016	13.2	17	100	4.0	71	52	38	61	47	6
LD21-017	10.3	23	100	3.6	70	53	25	62	49	12
LD21-018	21.6	20	100	3.9	70	54	35	60	50	11
LD21-019	5.1	20	100	3.8	70	53	10	64	51	11
LD21-020	5.3	14	100	4.1	64	56	8	77	54	5
LD21-021	10.8	22	100	3.6	59	51	16	63	49	15
LD21-022	27.7	21	100	3.8	90	56	55	69	45	10
LD21-023	52.5	19	100	3.8	89	63	67	70	46	11
LD21-024	36.6	18	100	3.9	94	61	61	66	51	11
LD21-025	40.0	19	100	3.8	100	62	63	74	45	13
LD21-026	16.8	10	100	2.8	80	60	37	75	52	30
LD21-027	50.8	22	100	3.7	86	60	62	73	49	14
LD21-028	16.2	20	100	3.8	90	55	36	64	50	7
LD21-029	38.3	24	100	3.6	79	62	43	77	51	12
LD21-030	33.0	23	100	3.6	74	60	30	74	54	13
LD21-032	42.4	18	100	3.9	94	62	60	80	34	15
LD21-033	29.8	22	100	3.6	73	61	34	74	55	8
LD21-034	18.2	22	100	3.6	50	50	18	67	46	28
LD21-036	8.0	8	100	5.2	50	42	13	53	40	0
LD21-040	10.7	22	100	3.6	41	45	14	76	41	28
LD21-042	38.1	10	100	3.0	90	61	76	67	42	12
LD21-043	34.8	19	100	3.9	79	52	52	59	46	26
LD21-044	48.1	19	100	3.9	84	56	76	60	44	32

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-045	30.3	18	100	4.0	78	54	60	63	41	22
LD21-046	28.5	20	100	3.9	80	51	42	64	42	8
LD21-047	21.5	25	100	3.7	80	51	26	66	47	5
LD21-048	35.5	22	100	3.7	91	58	63	67	44	16
LD21-049	13.0	22	100	3.6	27	40	14	77	34	28
LD21-050	17.9	19	100	3.8	63	52	30	61	48	13
LD21-052	22.3	18	100	4.0	78	56	38	62	51	12
LD21-053	18.8	10	100	2.9	90	64	40	68	60	12
LD21-054	11.1	26	100	3.4	38	45	17	58	42	25
LD21-055	24.0	20	100	4.1	75	51	49	74	36	21
LD21-056	10.1	22	100	3.8	36	42	8	77	40	29
LD21-057	39.7	20	100	3.9	80	56	56	63	46	18
LD21-058	42.8	21	100	3.8	76	55	60	63	45	25
LD21-059	26.6	20	100	3.9	75	55	58	65	41	18
LD21-060	34.9	20	100	3.9	85	58	60	64	48	12
LD21-061	40.8	20	100	3.9	70	54	37	63	49	17
LD21-062	13.3	21	100	3.8	67	51	26	64	46	9
LD21-063	24.3	18	100	3.9	78	53	40	63	46	19
LD21-064	15.5	19	100	3.8	68	53	30	61	50	24
LD21-065	18.9	18	100	3.9	89	56	42	66	49	16
LD21-066	27.2	21	100	3.6	76	58	40	66	54	12
LD21-067	13.0	17	100	4.0	76	51	35	68	41	21
LD21-068	8.1	17	100	4.9	82	59	24	66	56	4
LD21-069	11.6	18	100	4.0	78	52	30	63	47	6
LD21-070	7.0	19	100	3.9	79	53	18	67	50	17
LD21-071	39.5	23	100	3.7	87	58	60	63	50	15
LD21-072	33.7	22	100	3.7	68	55	39	65	47	16
LD21-073	17.0	10	100	2.8	90	57	35	72	49	20
LD21-074	11.3	19	100	3.9	68	52	23	64	48	8

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-075	15.3	20	100	3.8	75	52	37	65	44	24
LD21-076	20.4	20	100	3.7	95	57	41	61	54	7
LD21-077	5.5	20	100	3.9	75	52	20	60	50	8
LD21-078	5.5	18	100	3.9	72	53	17	59	51	8
LD21-079	16.9	18	100	3.9	83	57	30	66	53	3
LD21-080	9.4	19	100	3.9	84	54	27	62	51	16
LD21-081	9.6	19	100	3.8	79	55	24	61	54	10
LD21-082	21.0	18	100	3.9	89	56	37	63	52	12
LD21-083	11.9	17	100	4.0	82	53	31	69	45	20
LD21-084	16.0	18	100	3.9	83	52	35	63	46	10
LD21-086	6.1	20	100	3.7	65	54	13	67	51	18
LD21-087	4.9	19	100	3.8	58	51	11	63	49	31
LD21-088	23.3	14	100	4.3	71	55	28	64	52	13
LD21-089	6.7	17	100	4.0	76	52	19	64	49	2
LD21-090	3.5	19	100	3.8	58	49	8	69	47	13
LD21-091	14.1	18	100	3.9	72	51	33	65	46	20
LD21-092	39.1	20	100	3.7	80	59	62	66	48	10
LD21-094	5.3	20	100	3.8	65	51	11	62	50	12
LD21-095	7.6	16	100	4.2	69	50	14	62	48	17
LD21-096	9.9	17	100	4.0	76	53	21	59	51	16
LD21-097	5.5	18	100	3.9	61	54	15	67	52	8
LD21-098	7.5	18	100	3.9	50	50	14	66	48	28
LD21-099	46.8	27	100	3.7	96	62	74	69	44	15
LD21-100	31.0	20	100	3.7	80	57	41	65	51	19
LD21-101	46.8	21	100	3.8	90	60	70	67	43	16
LD21-102	37.6	22	100	3.9	86	59	51	68	50	19
LD21-103	11.8	20	100	3.8	70	53	25	66	49	22
LD21-104	8.5	17	100	3.9	35	40	12	67	37	47
LD21-105	12.2	18	100	4.1	78	55	24	63	52	9

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-106	43.4	27	100	3.7	100	63	68	73	45	13
LD21-107	47.4	23	100	3.6	96	65	68	72	47	14
LD21-108	19.3	19	100	3.8	74	53	38	67	44	15
LD21-110	15.7	19	100	4.0	95	56	46	68	46	11
LD21-111	16.4	19	100	4.0	74	52	33	65	47	10
LD21-112	27.8	20	100	3.7	75	58	48	67	49	18
LD21-113	6.8	19	100	4.0	63	49	13	59	47	3
LD21-114	7.6	19	100	4.4	63	53	7	61	52	9
LD21-115	6.3	17	100	4.2	53	50	6	62	49	13
LD21-117	3.5	10	100	2.8	70	58	5	65	57	4
SD20-001	24.6	17	100	4.0	94	56	41	66	48	10
SD20-002	14.1	20	100	3.9	60	50	32	67	46	23
SD20-003	42.2	18	100	3.9	94	64	61	77	45	7
SD20-004	46.5	18	100	4.1	94	59	65	68	49	12
SD20-005	34.8	17	100	4.0	82	56	49	64	49	21
SD20-006	14.5	17	100	4.0	82	55	45	64	47	10
SD20-007	33.6	20	100	3.8	95	57	62	64	48	7
SD20-008	12.6	21	100	3.7	62	51	27	64	44	20
SD20-009	12.0	18	100	3.9	72	54	20	62	53	13
SD20-010	20.1	19	100	3.9	89	57	47	65	49	14
SD20-011	27.5	18	100	3.9	89	60	52	69	48	14
SD20-012	18.8	21	100	3.7	67	54	41	62	47	5
SD20-013	25.1	25	100	3.9	72	52	32	64	47	4
SD20-014	32.1	22	100	3.6	82	61	44	73	52	8
SD20-015	18.1	22	100	3.5	64	55	23	64	53	12
SD20-016	12.9	22	100	3.6	41	45	15	75	40	24
SD20-017	8.8	22	100	3.6	55	49	15	63	47	21
SD20-018	24.4	20	100	3.8	90	63	46	74	53	11
SD20-019	33.6	18	100	4.0	78	53	56	59	45	16

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD20-020	35.4	24	100	3.6	71	61	42	74	52	13
SD20-021	41.2	21	100	3.8	76	57	73	61	46	16
SD20-022	30.0	21	100	3.9	76	59	41	66	55	0
SD20-023	11.1	23	100	3.9	48	48	13	58	47	6
SD20-024	22.0	18	100	3.9	83	55	43	63	49	18
SD20-025	23.4	18	100	4.0	67	53	44	62	46	20
SD20-026	12.6	17	100	4.0	82	55	29	63	51	5
SD20-027	24.0	21	100	3.8	76	54	45	62	48	5
SD20-028	43.9	20	100	3.9	70	55	50	64	46	17
SD20-029	10.5	18	100	3.9	78	56	28	63	53	10
SD20-030	14.7	18	100	3.9	78	51	38	60	47	22
SD20-031	22.0	19	100	3.8	79	54	49	64	45	24
SD20-032	23.9	21	100	3.7	62	51	35	65	44	25
SD20-033	14.4	19	100	3.8	95	55	35	63	52	8
SD20-034	10.1	19	100	4.0	74	51	24	60	48	10
SD20-035	12.2	19	100	3.9	84	55	32	62	51	6
SD20-036	17.9	18	100	3.9	83	53	37	65	46	17
SD20-037	13.8	16	100	4.2	56	46	18	62	43	29
SD20-038	42.8	25	100	3.7	92	62	63	69	50	17
SD20-039	21.3	20	100	3.8	80	55	40	66	48	15
SD20-040	38.7	24	100	3.8	88	62	65	69	47	16
SD20-041	29.1	23	100	3.6	83	60	50	69	51	17
SD20-042	7.9	17	100	4.0	82	52	18	60	51	2
SD20-043	17.4	19	100	3.8	79	54	36	65	47	8
SD20-044	13.1	18	100	3.9	72	54	35	66	48	10
SD20-045	3.3	1	100	2.0	0	38	6	72	33	44
SD20-046	5.5	20	100	3.7	65	54	12	63	52	7
SD20-047	5.1	18	100	3.9	39	45	9	65	42	23
SD20-049	6.4	19	100	4.2	68	56	6	63	55	11

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-001	28.8	17	100	4.0	88	57	46	67	47	7
SD21-002	29.3	17	100	4.0	94	60	48	70	49	9
SD21-003	25.9	21	100	4.0	90	57	46	70	46	10
SD21-004	34.1	17	100	4.0	88	59	59	66	48	12
SD21-005	39.3	17	100	4.0	94	59	56	65	50	12
SD21-006	13.8	18	100	4.1	83	55	44	63	48	9
SD21-007	11.5	17	100	4.1	71	54	19	62	53	14
SD21-008	13.9	20	100	3.8	65	51	25	64	46	15
SD21-009	23.1	17	100	4.0	94	56	50	66	46	5
SD21-010	15.9	20	100	3.8	80	54	35	65	48	13
SD21-011	35.7	19	100	4.0	84	61	59	74	45	12
SD21-012	19.6	20	100	3.8	65	53	42	62	46	18
SD21-013	20.5	18	100	3.9	78	60	37	66	56	0
SD21-014	41.5	22	100	3.6	86	62	61	75	43	21
SD21-015	13.9	22	100	3.6	36	43	12	72	39	32
SD21-016	8.1	22	100	3.6	45	45	11	76	42	21
SD21-017	10.1	22	100	3.6	64	54	20	62	52	6
SD21-018	21.5	22	100	3.5	64	56	27	64	53	12
SD21-019	45.0	19	100	3.9	74	54	69	58	45	17
SD21-020	26.2	21	100	3.8	67	55	33	76	47	14
SD21-021	18.3	18	100	3.9	61	50	41	59	44	5
SD21-022	33.2	23	100	3.6	74	60	37	73	52	14
SD21-023	16.0	24	100	3.6	58	51	21	60	50	18
SD21-024	28.4	23	100	3.8	78	53	42	69	44	6
SD21-025	17.1	19	100	3.8	84	56	34	62	53	15
SD21-026	16.8	18	100	3.9	78	54	39	62	50	25
SD21-027	26.2	21	100	3.9	67	53	36	62	47	12
SD21-028	49.5	20	100	3.9	85	57	65	63	46	17
SD21-029	17.3	17	100	4.0	76	50	39	67	41	21

Table 2: Primary Elections *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-030	8.8	18	100	3.9	83	56	24	62	54	10
SD21-031	11.5	19	100	3.9	68	49	30	64	42	23
SD21-032	33.8	22	100	3.7	68	54	46	63	45	24
SD21-033	14.4	20	100	3.8	95	56	34	62	53	7
SD21-034	18.9	20	100	3.7	85	55	38	63	50	4
SD21-035	11.1	18	100	4.0	83	54	30	62	50	7
SD21-036	4.2	18	100	3.9	56	48	10	65	46	14
SD21-037	10.7	17	100	4.0	71	52	23	62	49	11
SD21-038	33.4	23	100	3.6	91	61	55	71	49	15
SD21-039	39.0	24	100	3.5	92	63	65	70	47	14
SD21-040	47.5	24	100	3.8	100	64	71	70	49	16
SD21-041	10.0	17	100	3.9	65	51	20	66	47	20
SD21-042	20.3	18	100	4.1	72	56	26	64	53	10
SD21-043	17.9	19	100	3.8	79	54	37	65	47	9
SD21-044	12.7	19	100	4.0	74	53	35	67	45	11
SD21-045	7.1	17	100	4.0	82	55	18	61	53	1
SD21-046	4.6	17	100	4.0	59	52	7	72	50	7
SD21-048	5.2	20	100	3.9	55	47	9	60	45	3
SD21-049	6.9	19	100	4.2	68	56	7	62	55	11

Table 3: General Elections (contests with Black candidate)

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
CD20-001	41.9	4	100	2.0	100	54	38	100	21	37
CD20-002	18.2	6	100	2.0	17	47	14	99	38	19
CD20-003	18.7	5	100	2.0	0	36	18	98	22	37
CD20-004	24.4	3	100	2.0	100	68	21	93	39	21
CD20-005	10.7	3	100	2.0	0	33	10	100	24	34
CD20-006	32.0	3	100	2.0	100	60	30	100	41	15
CD20-007	15.4	3	100	2.0	0	41	13	91	32	30
CD20-008	25.9	4	100	2.0	0	48	30	100	26	32
CD20-009	17.4	4	100	2.0	0	43	16	100	31	28
CD20-010	10.1	3	100	2.0	0	31	11	100	25	33
CD20-012	34.1	7	100	1.7	100	76	39	99	62	7
CD20-013	13.9	3	100	2.0	0	32	12	100	22	36
CD21-001	22.4	5	100	2.0	0	38	19	98	22	37
CD21-002	39.1	3	100	2.0	100	53	34	100	23	35
CD21-003	15.7	3	100	2.0	0	42	14	93	32	29
CD21-004	27.5	3	100	2.0	0	48	34	100	26	32
CD21-005	23.2	6	100	2.0	33	47	18	99	36	22
CD21-006	20.4	3	100	2.0	100	65	17	100	40	17
CD21-007	15.3	3	100	2.0	0	38	12	100	27	32
CD21-008	16.5	4	100	2.0	0	40	14	100	28	30
CD21-009	36.3	7	100	1.7	100	79	43	99	64	3
CD21-010	16.2	3	100	2.0	0	34	11	100	23	35
CD21-011	19.2	3	100	2.0	0	34	15	100	25	33
CD21-012	17.1	3	100	2.0	0	42	18	100	32	26
CD21-013	14.8	3	100	2.0	0	37	14	100	27	32
LD20-001	36.6	4	100	2.0	0	47	28	100	18	39
LD20-002	25.7	5	100	2.0	0	43	25	100	24	34
LD20-003	19.2	7	100	2.0	0	39	19	100	25	33
LD20-004	20.6	4	100	2.0	0	36	15	100	16	41

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-005	41.0	3	100	2.0	100	55	33	100	18	39
LD20-006	7.1	5	100	2.0	0	34	7	84	25	49
LD20-007	22.4	4	100	2.0	0	43	23	100	26	32
LD20-008	42.5	6	100	2.0	33	51	33	100	26	32
LD20-009	27.9	4	100	2.0	0	43	21	100	27	31
LD20-010	22.0	5	100	2.0	0	35	23	100	15	41
LD20-011	15.4	6	100	2.0	83	54	13	100	48	6
LD20-012	36.9	7	100	2.0	14	47	38	100	15	41
LD20-013	7.9	2	100	2.0	0	27	9	94	18	42
LD20-014	17.8	5	100	2.0	0	40	20	100	25	33
LD20-015	10.7	5	100	2.0	0	31	12	100	22	36
LD20-016	18.3	5	100	2.0	0	36	17	95	24	37
LD20-017	10.1	11	100	2.0	0	37	11	90	30	34
LD20-018	21.1	3	100	2.0	100	62	21	100	51	5
LD20-019	6.3	1	100	2.0	0	37	6	100	33	25
LD20-021	37.4	5	100	2.0	20	44	29	100	21	37
LD20-022	29.3	4	100	2.0	0	43	28	100	18	39
LD20-023	50.6	6	100	2.0	100	60	38	100	16	41
LD20-024	38.2	8	100	2.0	100	56	37	100	28	29
LD20-025	42.6	4	100	2.0	0	40	34	99	14	42
LD20-026	16.5	5	100	2.0	0	31	11	100	22	36
LD20-027	51.6	6	100	2.0	100	63	44	100	20	37
LD20-028	15.8	5	100	2.0	0	27	10	100	19	38
LD20-029	37.2	10	100	1.6	100	87	40	100	78	0
LD20-030	28.2	4	100	2.0	100	59	25	100	45	11
LD20-031	39.8	8	100	1.6	100	84	48	100	71	0
LD20-032	48.1	10	100	2.0	100	63	50	100	28	31
LD20-033	39.9	6	100	2.0	100	61	38	99	38	19

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-034	11.5	6	100	2.0	0	40	6	100	36	22
LD20-035	18.0	6	67	2.0	33	46	12	64	44	39
LD20-036	7.5	3	33	2.0	67	56	6	59	56	15
LD20-037	11.3	6	100	2.0	0	34	10	100	27	31
LD20-038	39.4	10	100	1.6	100	83	42	98	72	2
LD20-040	11.3	6	100	2.0	0	38	7	100	33	25
LD20-041	7.1	3	100	2.0	0	43	6	94	40	16
LD20-042	38.1	6	100	2.0	100	66	48	100	36	22
LD20-043	33.9	6	100	2.0	0	47	29	100	26	32
LD20-044	48.1	5	100	2.0	100	71	52	100	40	16
LD20-045	31.4	7	100	2.0	57	50	32	100	27	32
LD20-046	25.0	5	100	2.0	20	42	27	99	21	37
LD20-047	23.8	6	100	2.0	17	43	24	98	26	32
LD20-048	35.5	6	100	2.0	100	56	40	100	29	30
LD20-049	12.3	6	100	2.0	50	49	7	100	45	10
LD20-050	17.5	3	100	2.0	0	41	24	92	25	37
LD20-052	11.0	4	100	2.0	0	26	10	100	18	38
LD20-054	12.9	8	50	2.0	0	43	9	91	38	22
LD20-055	26.2	5	100	2.0	0	42	25	100	22	36
LD20-056	10.2	7	100	2.0	100	71	10	100	66	0
LD20-057	39.7	5	100	2.0	100	58	38	98	33	25
LD20-058	43.1	8	100	2.0	100	69	45	96	47	8
LD20-059	28.6	5	100	2.0	0	37	24	100	17	40
LD20-060	34.6	8	100	2.0	88	59	38	100	34	24
LD20-061	40.0	8	100	2.0	100	64	31	100	48	8
LD20-062	13.7	5	100	2.0	0	32	11	100	24	34
LD20-063	24.8	4	100	2.0	0	48	24	100	32	27
LD20-064	15.1	4	100	2.0	0	39	14	100	29	30

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-065	19.6	5	100	2.0	0	33	19	94	19	43
LD20-066	24.0	4	100	2.0	0	42	21	100	22	36
LD20-067	7.9	7	100	2.0	0	21	6	100	16	40
LD20-068	8.4	5	100	2.0	0	36	7	100	31	27
LD20-069	11.6	5	100	2.0	0	34	11	100	26	32
LD20-070	7.2	4	100	2.0	0	24	6	100	19	38
LD20-071	40.3	7	100	1.9	100	76	46	99	56	4
LD20-072	34.4	8	100	2.0	100	71	34	100	56	1
LD20-073	14.6	3	100	2.0	0	35	19	100	28	31
LD20-074	11.4	6	100	2.0	0	45	11	100	38	19
LD20-075	15.3	5	100	2.0	0	38	15	100	27	32
LD20-076	21.6	7	100	2.0	0	41	20	100	26	32
LD20-077	7.3	4	100	2.0	0	26	7	100	19	38
LD20-079	22.3	7	100	2.6	14	34	16	98	15	41
LD20-080	9.5	7	100	2.0	0	23	8	100	16	40
LD20-081	9.6	5	100	2.0	0	26	8	100	19	38
LD20-082	20.2	1	100	2.0	0	40	18	100	27	32
LD20-083	19.5	5	100	2.0	60	48	12	100	24	34
LD20-084	14.1	6	100	2.0	0	31	13	100	21	37
LD20-086	6.0	4	100	2.0	0	32	6	100	28	31
LD20-088	16.0	4	100	2.0	100	56	18	99	47	6
LD20-089	7.9	4	100	2.0	0	27	7	100	22	36
LD20-091	4.8	2	100	2.0	0	23	6	100	16	40
LD20-092	40.2	9	100	1.7	100	80	47	100	63	9
LD20-095	9.6	6	100	2.0	0	32	8	100	26	32
LD20-096	8.9	4	100	2.0	0	35	7	100	30	30
LD20-098	9.2	6	100	2.0	0	41	8	100	36	22
LD20-099	36.0	6	100	2.0	100	63	42	99	38	20

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-100	30.5	8	100	1.6	100	82	36	100	71	0
LD20-101	48.0	10	100	1.7	100	82	55	99	60	12
LD20-102	33.8	9	100	1.6	100	87	40	98	79	0
LD20-103	14.2	4	100	2.0	0	47	14	100	38	19
LD20-104	12.0	6	100	2.0	0	47	10	100	41	16
LD20-105	12.9	6	100	2.0	50	49	13	100	41	14
LD20-106	46.3	15	100	1.5	100	91	60	99	79	2
LD20-107	53.6	10	100	1.6	100	87	58	99	70	4
LD20-108	19.5	8	100	2.0	0	38	17	100	25	33
LD20-109	15.3	8	100	2.0	0	35	12	100	27	32
LD20-110	14.6	3	100	2.0	0	28	13	100	17	39
LD20-111	22.8	6	100	2.0	0	38	22	100	20	37
LD20-112	9.2	4	100	2.0	0	28	8	100	22	36
LD20-115	6.9	1	100	2.0	100	59	6	100	44	11
LD20-116	7.2	1	100	2.0	0	49	7	100	46	7
LD21-001	17.7	5	100	2.0	0	35	15	91	22	42
LD21-002	23.7	5	100	2.0	20	43	23	99	26	32
LD21-003	19.4	6	100	2.0	0	38	18	100	25	34
LD21-004	24.9	3	100	2.0	0	33	19	100	17	40
LD21-005	37.5	3	100	2.0	67	51	30	100	17	40
LD21-007	22.2	4	100	2.0	0	43	22	100	27	32
LD21-008	44.2	6	100	2.0	83	54	36	100	28	30
LD21-009	24.6	5	100	2.0	0	37	19	98	23	37
LD21-010	33.1	5	100	2.0	0	38	26	100	17	40
LD21-011	14.2	6	100	2.0	83	52	11	100	46	8
LD21-012	37.7	5	100	2.0	0	45	34	100	16	41
LD21-013	8.3	6	100	2.0	0	28	7	97	22	37
LD21-014	17.8	5	100	2.0	0	40	20	100	25	33

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-015	10.6	5	100	2.0	0	32	13	100	22	36
LD21-016	13.2	5	100	2.0	0	34	14	95	23	38
LD21-017	10.3	11	100	2.0	0	37	11	90	31	32
LD21-018	21.6	3	100	2.0	100	62	21	100	52	4
LD21-019	5.1	1	100	2.0	0	34	5	100	31	28
LD21-021	10.8	6	100	2.0	0	35	7	87	31	37
LD21-022	27.7	4	100	2.0	0	39	26	100	17	40
LD21-023	52.5	6	100	2.0	100	61	39	100	15	41
LD21-024	36.6	8	100	2.0	100	55	37	100	28	29
LD21-025	40.0	5	100	2.0	20	42	30	99	14	42
LD21-027	50.8	8	100	2.0	100	64	48	100	26	32
LD21-028	16.2	5	100	2.0	0	26	10	100	17	40
LD21-029	38.3	8	100	1.6	100	85	44	100	74	0
LD21-030	33.0	7	100	1.6	100	87	34	100	80	0
LD21-031	38.1	3	100	1.0	100	100	44	.	.	.
LD21-032	42.4	4	100	2.0	100	57	43	100	26	32
LD21-033	29.8	10	100	1.6	100	83	31	99	76	0
LD21-034	18.2	6	100	2.0	33	48	13	100	41	15
LD21-036	8.0	2	100	2.0	0	36	7	100	30	28
LD21-038	43.6	2	100	1.0	100	100	47	.	.	.
LD21-040	10.7	4	100	2.0	0	39	6	100	35	23
LD21-042	38.1	6	100	2.0	100	66	48	100	36	22
LD21-043	34.8	6	100	2.0	17	49	30	100	27	31
LD21-044	48.1	5	100	2.0	100	71	52	100	40	16
LD21-045	30.3	7	100	2.0	29	49	31	100	26	33
LD21-046	28.5	4	100	2.0	0	40	28	100	17	39
LD21-047	21.5	6	100	2.0	17	46	23	97	30	28
LD21-048	35.5	6	100	2.0	100	56	40	100	29	30

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-049	13.0	6	100	2.0	33	47	8	100	42	13
LD21-050	17.9	3	100	2.0	0	42	26	93	25	37
LD21-052	22.3	4	100	2.0	0	44	22	100	21	36
LD21-054	11.1	8	50	2.0	0	45	10	84	40	22
LD21-055	24.0	5	100	2.0	0	41	22	100	23	35
LD21-056	10.1	7	100	2.0	100	71	10	100	66	0
LD21-057	39.7	5	100	2.0	100	58	38	98	33	25
LD21-058	42.8	8	100	2.0	100	68	44	98	45	11
LD21-059	26.6	5	100	2.0	0	35	22	100	17	40
LD21-060	34.9	8	100	2.0	100	59	38	100	34	23
LD21-061	40.8	8	100	2.0	100	64	32	100	48	8
LD21-062	13.3	5	100	2.0	0	31	10	100	23	34
LD21-063	24.3	4	100	2.0	0	47	22	100	32	26
LD21-064	15.5	4	100	2.0	0	39	14	100	29	30
LD21-065	18.9	5	100	2.0	0	33	19	94	19	43
LD21-066	27.2	6	100	2.0	50	51	23	100	36	22
LD21-067	13.0	5	100	2.0	0	29	13	100	19	38
LD21-068	8.1	5	100	2.0	0	36	7	100	31	27
LD21-069	11.6	4	100	2.0	0	34	10	100	26	32
LD21-070	7.0	4	100	2.0	0	23	6	100	18	39
LD21-071	39.5	6	100	2.0	100	71	46	98	49	4
LD21-072	33.7	7	100	2.0	100	68	32	100	53	2
LD21-073	17.0	2	100	2.0	0	36	13	100	22	36
LD21-074	11.3	6	100	2.0	0	43	11	100	36	22
LD21-075	15.3	5	100	2.0	0	38	15	100	27	32
LD21-076	20.4	7	100	2.0	0	40	20	100	26	33
LD21-077	5.5	3	100	2.0	0	24	6	100	18	39
LD21-079	16.9	5	100	2.0	0	36	12	92	23	40

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-080	9.4	7	100	2.0	0	24	9	100	17	40
LD21-081	9.6	5	100	2.0	0	26	9	100	19	38
LD21-082	21.0	5	100	2.0	0	34	15	100	23	35
LD21-083	11.9	3	100	2.0	0	27	7	100	21	37
LD21-084	16.0	6	100	2.0	0	33	15	100	22	36
LD21-086	6.1	4	100	2.0	0	31	6	100	27	32
LD21-088	23.3	5	100	1.8	100	67	23	100	57	6
LD21-089	6.7	4	100	2.0	0	25	6	100	20	38
LD21-091	14.1	3	100	2.0	0	36	19	100	30	28
LD21-092	39.1	9	100	1.7	100	79	44	100	62	12
LD21-095	7.6	6	100	2.0	0	31	5	100	27	32
LD21-096	9.9	4	100	2.0	0	36	9	100	30	30
LD21-098	7.5	6	100	2.0	0	39	7	100	35	23
LD21-099	46.8	13	100	1.7	100	85	58	99	65	3
LD21-100	31.0	8	100	1.6	100	82	36	99	71	0
LD21-101	46.8	9	100	1.7	100	81	52	99	62	13
LD21-102	37.6	9	100	1.6	100	89	45	98	81	0
LD21-103	11.8	4	100	2.0	0	42	12	100	34	24
LD21-104	8.5	6	100	2.0	0	45	7	100	41	16
LD21-105	12.2	7	100	2.0	43	48	13	100	41	15
LD21-106	43.4	11	100	1.6	100	86	55	99	71	2
LD21-107	47.4	8	100	1.6	100	82	50	99	65	10
LD21-108	19.3	8	100	2.0	0	37	16	100	25	34
LD21-109	16.8	4	100	2.0	0	39	14	100	28	30
LD21-110	15.7	3	100	2.0	0	33	18	100	18	39
LD21-111	16.4	3	100	2.0	0	30	13	100	19	38
LD21-112	27.8	7	100	1.7	100	78	38	99	65	2
LD21-113	6.8	3	100	2.0	0	32	6	97	25	34

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-114	7.6	1	100	2.0	100	60	7	100	58	0
LD21-115	6.3	1	100	2.0	0	46	5	100	43	12
SD20-001	24.6	4	100	2.0	0	42	18	98	21	38
SD20-002	14.1	6	100	2.0	0	33	15	99	23	35
SD20-003	42.2	5	100	2.0	100	53	42	100	21	37
SD20-004	46.5	6	100	2.0	100	59	40	100	22	36
SD20-005	34.8	4	100	2.0	100	54	29	100	25	33
SD20-006	14.5	6	100	2.0	0	34	16	100	20	38
SD20-007	33.6	3	100	2.0	0	46	35	100	18	39
SD20-008	12.6	3	100	2.0	0	37	10	86	31	35
SD20-009	12.0	3	100	2.0	67	55	10	100	49	6
SD20-010	20.1	5	100	2.0	0	37	20	100	16	40
SD20-011	27.5	4	100	2.0	0	48	23	100	20	38
SD20-012	18.8	3	100	2.0	0	40	15	100	22	36
SD20-013	25.1	4	100	2.0	25	43	26	100	22	35
SD20-014	32.1	7	100	1.9	100	67	32	99	53	10
SD20-015	18.1	6	100	2.0	17	43	12	100	34	23
SD20-016	12.9	6	100	2.0	33	47	9	100	42	13
SD20-017	8.8	6	100	2.0	0	37	7	88	33	32
SD20-018	24.4	3	100	2.0	0	43	21	100	27	32
SD20-019	33.6	5	100	2.0	100	51	31	100	29	30
SD20-020	35.4	8	100	1.6	100	83	40	100	72	0
SD20-021	41.2	4	100	2.0	100	67	49	100	35	23
SD20-022	30.0	3	100	2.0	33	47	27	100	27	32
SD20-023	11.1	7	57	2.0	57	54	10	79	49	13
SD20-024	22.0	3	100	2.0	0	44	19	100	31	27
SD20-025	23.4	4	100	2.0	0	43	26	100	21	37
SD20-026	12.6	4	100	2.0	0	24	7	100	18	39

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD20-027	24.0	5	100	2.0	0	41	21	100	25	33
SD20-028	43.9	7	100	2.0	100	67	41	99	45	11
SD20-029	10.5	5	100	2.0	0	27	9	100	18	39
SD20-030	14.7	3	100	2.0	0	32	18	100	19	38
SD20-031	22.0	3	100	2.0	0	45	23	100	29	30
SD20-032	23.9	6	100	2.0	100	57	23	100	44	10
SD20-033	14.4	4	100	2.0	0	30	12	100	20	38
SD20-034	10.1	5	100	2.0	0	30	10	100	23	35
SD20-035	12.2	4	100	2.0	0	36	11	100	28	31
SD20-036	17.9	5	100	2.0	0	40	12	100	23	35
SD20-037	13.8	4	100	2.0	50	49	12	100	42	14
SD20-038	42.8	10	100	1.6	100	87	53	99	73	0
SD20-039	21.3	5	100	2.0	100	57	24	100	43	12
SD20-040	38.7	9	100	1.7	100	81	49	99	65	6
SD20-041	29.1	5	100	2.0	100	58	30	100	39	17
SD20-042	7.9	4	100	2.0	0	29	6	100	24	34
SD20-043	17.4	8	100	2.0	0	35	15	100	24	34
SD20-044	13.1	5	100	2.0	0	31	16	99	19	39
SD20-049	6.4	1	100	2.0	100	58	6	100	48	4
SD21-001	28.8	3	100	2.0	0	46	20	97	21	38
SD21-002	29.3	3	100	2.0	0	45	22	100	24	34
SD21-003	25.9	5	100	2.0	0	41	26	99	20	38
SD21-004	34.1	4	100	2.0	0	48	34	100	21	37
SD21-005	39.3	4	100	2.0	100	56	30	100	25	34
SD21-006	13.8	6	100	2.0	0	32	15	100	20	38
SD21-007	11.5	3	100	2.0	67	55	10	100	50	6
SD21-008	13.9	3	100	2.0	0	38	11	84	31	36
SD21-009	23.1	3	100	2.0	0	37	20	99	22	37

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-010	15.9	5	100	2.0	0	37	10	100	19	38
SD21-011	35.7	3	100	2.0	67	51	32	100	25	33
SD21-012	19.6	3	100	2.0	0	40	16	100	22	36
SD21-013	20.5	3	100	2.0	0	42	22	100	26	32
SD21-014	41.5	6	100	2.0	100	61	40	100	34	22
SD21-015	13.9	6	100	2.0	50	52	10	100	47	8
SD21-016	8.1	6	100	2.0	17	44	6	100	40	16
SD21-017	10.1	6	100	2.0	0	33	8	99	28	31
SD21-018	21.5	6	100	2.0	50	48	16	100	38	19
SD21-019	45.0	5	100	2.0	100	65	45	100	37	21
SD21-020	26.2	5	60	2.0	60	51	14	85	45	13
SD21-021	18.3	3	100	2.0	0	38	22	100	22	36
SD21-022	33.2	4	100	2.0	100	64	30	100	48	9
SD21-023	16.0	3	100	2.0	100	65	24	87	31	32
SD21-024	28.4	4	100	2.0	50	51	31	98	28	31
SD21-025	17.1	3	100	2.0	0	38	15	100	28	31
SD21-026	16.8	3	100	2.0	0	33	16	100	20	37
SD21-027	26.2	6	100	2.0	50	50	23	99	35	23
SD21-028	49.5	5	100	2.0	100	68	49	98	39	18
SD21-029	17.3	3	100	2.0	0	33	13	100	19	38
SD21-030	8.8	4	100	2.0	0	24	8	100	18	39
SD21-031	11.5	4	100	2.0	0	37	12	100	29	30
SD21-032	33.8	6	100	2.0	100	69	36	99	51	3
SD21-033	14.4	4	100	2.0	0	31	12	100	21	37
SD21-034	18.9	5	100	2.0	20	45	13	100	23	35
SD21-035	11.1	4	100	2.0	0	35	10	100	28	30
SD21-037	10.7	6	100	2.0	0	32	10	100	24	34
SD21-038	33.4	5	100	2.0	100	62	35	100	42	14

Table 3: General Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-039	39.0	8	100	1.6	100	82	48	100	66	9
SD21-040	47.5	10	100	1.6	100	89	60	97	76	0
SD21-041	10.0	5	100	2.0	0	44	9	100	38	19
SD21-042	20.3	4	100	2.0	100	59	20	100	49	3
SD21-043	17.9	8	100	2.0	0	36	15	100	24	34
SD21-044	12.7	5	100	2.0	0	31	15	99	19	39
SD21-045	7.1	4	100	2.0	0	30	7	100	25	33
SD21-049	6.9	1	100	2.0	100	59	6	100	50	0

Table 4: Primary Elections (contests with Black candidate)

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
CD20-001	41.9	14	100	4.1	100	61	62	69	48	12
CD20-002	18.2	15	100	4.1	67	55	26	71	50	14
CD20-003	18.7	15	100	4.0	73	54	40	66	47	22
CD20-004	24.4	16	100	3.9	75	59	34	68	55	12
CD20-005	10.7	16	100	3.9	56	51	21	62	48	15
CD20-006	32.0	15	100	4.2	67	51	47	59	44	23
CD20-007	15.4	15	100	4.0	73	52	30	62	47	5
CD20-008	25.9	14	100	4.1	79	54	52	60	48	20
CD20-009	17.4	16	100	4.6	56	46	33	63	42	13
CD20-010	10.1	15	100	4.0	73	52	25	62	48	27
CD20-011	3.7	1	100	5.0	100	54	5	100	47	.
CD20-012	34.1	20	100	3.6	85	60	54	68	50	18
CD20-013	13.9	14	100	4.1	71	54	33	59	52	14
CD21-001	22.4	15	100	4.0	73	55	41	66	47	18
CD21-002	39.1	14	100	4.1	100	61	60	70	47	13
CD21-003	15.7	16	100	4.1	56	48	28	65	40	17
CD21-004	27.5	14	100	4.1	71	54	55	60	48	20
CD21-005	23.2	14	100	4.1	71	59	32	71	54	12
CD21-006	20.4	15	100	4.5	60	52	25	76	47	10
CD21-007	15.3	14	100	4.1	57	49	32	61	44	30
CD21-008	16.5	14	100	4.1	64	48	36	62	41	29
CD21-009	36.3	20	100	3.6	80	60	56	68	50	19
CD21-010	16.2	14	100	4.1	86	54	35	63	50	15
CD21-011	19.2	14	100	4.1	64	51	35	63	46	24
CD21-012	17.1	16	100	3.9	75	53	36	63	47	21
CD21-013	14.8	17	100	3.9	76	53	31	64	48	11
CD21-014	3.6	1	100	5.0	100	54	5	100	47	.
LD20-001	36.6	14	100	4.1	93	58	58	73	40	19
LD20-002	25.7	15	100	4.1	87	57	45	70	47	12

– Ex. 11541 –

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-003	19.2	19	100	3.7	63	53	41	66	43	24
LD20-004	20.6	15	100	4.0	93	58	52	69	46	12
LD20-005	41.0	17	100	3.8	94	60	61	68	47	16
LD20-006	7.1	13	100	4.3	69	51	15	63	49	8
LD20-007	22.4	15	100	4.1	93	63	49	78	49	4
LD20-008	42.5	15	100	4.1	93	58	59	66	47	16
LD20-009	27.9	14	100	4.1	71	56	38	64	50	13
LD20-010	22.0	14	100	4.1	79	54	44	72	36	18
LD20-011	15.4	15	100	4.1	47	45	16	67	40	29
LD20-012	36.9	15	100	4.1	87	59	61	67	46	6
LD20-013	7.9	14	100	4.1	57	50	22	65	45	10
LD20-014	17.8	13	100	4.2	92	56	47	61	51	12
LD20-015	10.7	13	100	4.2	77	52	38	62	45	9
LD20-016	18.3	15	100	4.0	73	50	39	60	44	4
LD20-017	10.1	16	100	3.9	69	53	26	64	49	6
LD20-018	21.1	14	100	4.1	71	55	35	61	51	14
LD20-019	6.3	15	100	4.0	53	49	10	66	47	13
LD20-020	5.5	12	100	4.4	58	50	8	79	47	7
LD20-021	37.4	17	100	3.9	88	56	62	63	46	15
LD20-022	29.3	18	100	3.9	94	58	55	72	42	9
LD20-023	50.6	16	100	4.0	100	64	66	70	50	12
LD20-024	38.2	16	100	3.9	94	63	63	68	52	11
LD20-025	42.6	8	100	5.2	100	58	68	68	40	24
LD20-026	16.5	15	100	4.0	60	53	35	67	46	27
LD20-027	51.6	18	100	3.8	78	57	59	72	36	36
LD20-028	15.8	15	100	4.0	93	57	35	66	51	8
LD20-029	37.2	20	100	3.7	65	61	38	79	50	7
LD20-030	28.2	19	100	3.7	68	59	33	73	52	8

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-031	39.8	20	100	3.7	95	64	58	74	49	7
LD20-032	48.1	16	100	3.9	100	68	66	78	52	6
LD20-033	39.9	16	100	4.0	88	65	58	75	52	0
LD20-034	11.5	15	100	4.1	33	42	12	71	38	39
LD20-035	18.0	15	100	4.0	67	57	31	68	52	13
LD20-036	7.5	16	100	4.0	50	49	13	62	47	18
LD20-037	11.3	16	100	4.0	62	52	24	62	50	6
LD20-038	39.4	15	100	4.0	73	61	53	69	54	21
LD20-040	11.3	14	100	4.1	43	46	17	69	41	31
LD20-041	7.1	15	100	4.1	40	44	11	70	41	28
LD20-042	38.1	9	100	2.8	89	60	76	66	44	12
LD20-043	33.9	16	100	4.0	75	51	51	58	44	30
LD20-044	48.1	16	100	4.0	81	56	76	60	44	36
LD20-045	31.4	17	100	3.9	71	54	60	62	42	29
LD20-046	25.0	15	100	4.1	93	52	41	60	47	13
LD20-047	23.8	18	100	4.1	67	47	24	66	41	10
LD20-048	35.5	18	100	3.8	94	58	63	67	43	18
LD20-049	12.3	15	100	4.1	33	41	10	68	38	38
LD20-050	17.5	16	100	3.9	56	50	28	60	47	16
LD20-052	11.0	15	100	4.1	67	55	26	62	52	10
LD20-054	12.9	14	100	4.1	57	52	18	62	50	0
LD20-055	26.2	17	100	4.2	71	49	51	72	34	24
LD20-056	10.2	14	100	4.5	43	45	8	76	42	21
LD20-057	39.7	16	100	4.1	75	54	56	62	43	24
LD20-058	43.1	17	100	4.0	71	54	60	61	43	32
LD20-059	28.6	17	100	4.1	71	53	60	62	39	24
LD20-060	34.6	16	100	4.1	81	56	60	63	44	16
LD20-061	40.0	16	100	4.1	62	52	35	62	46	23

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-062	13.7	17	100	4.0	65	50	27	65	44	11
LD20-063	24.8	15	100	4.1	73	52	43	60	45	20
LD20-064	15.1	16	100	4.1	62	51	30	59	48	31
LD20-065	19.6	15	100	4.0	87	55	43	66	48	18
LD20-066	24.0	15	100	4.3	80	50	42	61	42	12
LD20-067	7.9	14	100	4.1	64	47	22	70	41	18
LD20-068	8.4	15	100	4.3	80	54	24	63	51	5
LD20-069	11.6	15	100	4.1	73	51	31	61	47	6
LD20-070	7.2	15	100	4.1	80	56	19	65	53	19
LD20-071	40.3	19	100	3.8	84	58	63	62	50	17
LD20-072	34.4	19	100	3.8	68	53	41	65	44	24
LD20-073	14.6	15	100	4.1	73	50	36	64	43	24
LD20-074	11.4	16	100	4.0	62	50	23	65	45	9
LD20-075	15.3	17	100	3.9	76	52	37	65	44	27
LD20-076	21.6	15	100	4.0	93	55	42	60	51	25
LD20-077	7.3	15	100	4.1	73	52	24	61	49	11
LD20-078	6.1	15	100	4.1	60	52	19	62	50	14
LD20-079	22.3	16	100	4.2	81	54	41	68	44	15
LD20-080	9.5	14	100	4.1	79	55	26	62	52	21
LD20-081	9.6	14	100	4.1	71	54	24	61	52	12
LD20-082	20.2	8	100	2.6	100	61	42	69	56	8
LD20-083	19.5	14	100	4.1	71	51	37	64	44	33
LD20-084	14.1	14	100	4.1	93	52	32	63	47	11
LD20-086	6.0	15	100	4.0	67	54	14	65	52	12
LD20-087	5.1	15	100	4.0	80	52	13	66	50	2
LD20-088	16.0	11	100	4.5	55	52	24	65	49	16
LD20-089	7.9	14	100	4.1	86	54	23	60	52	1
LD20-090	3.3	14	100	4.1	50	46	8	69	44	21

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD20-091	4.8	16	100	3.9	56	52	13	64	50	33
LD20-092	40.2	18	100	3.7	78	60	65	65	49	14
LD20-094	5.7	19	100	3.9	47	45	12	57	43	15
LD20-095	9.6	14	100	4.1	64	51	22	61	49	13
LD20-096	8.9	14	100	4.1	64	48	17	57	47	18
LD20-097	5.5	14	100	4.1	57	54	14	65	51	11
LD20-098	9.2	14	100	4.2	50	51	18	62	49	29
LD20-099	36.0	20	100	3.6	85	61	65	69	46	17
LD20-100	30.5	17	100	3.8	76	56	42	65	49	21
LD20-101	48.0	18	100	3.7	89	61	72	67	44	21
LD20-102	33.8	16	100	4.3	81	58	47	66	51	18
LD20-103	14.2	14	100	4.2	57	49	24	63	44	30
LD20-104	12.0	12	100	4.4	50	44	16	61	42	37
LD20-105	12.9	15	100	4.2	73	54	24	64	50	10
LD20-106	46.3	23	100	3.7	100	64	73	71	45	13
LD20-107	53.6	21	100	3.7	95	64	72	71	44	14
LD20-108	19.5	16	100	3.9	69	52	41	67	42	16
LD20-109	15.3	17	100	3.8	71	52	30	62	48	9
LD20-110	14.6	15	100	4.0	87	53	37	64	47	14
LD20-111	22.8	16	100	4.1	94	54	46	67	42	13
LD20-112	9.2	14	100	4.1	79	50	19	64	48	10
LD20-115	6.9	12	100	4.5	58	57	7	68	56	20
LD20-116	7.2	12	100	4.8	58	55	8	67	54	16
LD20-117	3.6	17	100	3.8	59	52	5	68	51	5
LD21-001	17.7	14	100	4.1	100	55	35	69	47	11
LD21-002	23.7	15	100	4.0	67	55	37	62	51	25
LD21-003	19.4	18	100	3.8	61	51	35	68	41	25
LD21-004	24.9	15	100	4.1	87	56	54	65	45	9

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-005	37.5	16	100	3.9	94	59	60	67	46	22
LD21-007	22.2	15	100	4.1	93	63	48	78	49	4
LD21-008	44.2	15	100	4.1	93	58	59	66	46	13
LD21-009	24.6	14	100	4.1	64	55	38	61	52	19
LD21-010	33.1	14	100	4.1	100	58	58	64	49	12
LD21-011	14.2	15	100	4.1	40	44	15	67	40	39
LD21-012	37.7	14	100	4.1	100	59	60	68	46	7
LD21-013	8.3	15	100	4.1	67	53	19	64	49	16
LD21-014	17.8	13	100	4.2	92	56	47	61	51	12
LD21-015	10.6	14	100	4.3	71	50	40	60	44	7
LD21-016	13.2	14	100	4.1	64	51	38	59	46	7
LD21-017	10.3	17	100	3.9	65	51	26	62	47	7
LD21-018	21.6	15	100	4.1	67	52	35	60	48	14
LD21-019	5.1	15	100	4.0	60	50	10	64	48	15
LD21-020	5.3	11	100	4.4	64	52	8	80	50	7
LD21-021	10.8	15	100	4.1	60	50	16	63	47	22
LD21-022	27.7	17	100	3.9	94	57	54	70	46	12
LD21-023	52.5	15	100	4.0	100	65	67	71	50	13
LD21-024	36.6	15	100	4.0	93	61	61	67	50	13
LD21-025	40.0	15	100	4.0	100	63	62	77	43	17
LD21-026	16.8	9	100	2.6	78	61	37	75	54	30
LD21-027	50.8	18	100	3.9	89	60	62	75	49	17
LD21-028	16.2	15	100	4.0	93	57	35	67	51	8
LD21-029	38.3	20	100	3.7	80	63	44	78	51	7
LD21-030	33.0	19	100	3.7	74	61	30	74	55	8
LD21-032	42.4	14	100	4.1	93	61	61	78	35	12
LD21-033	29.8	15	100	4.1	73	62	34	75	57	0
LD21-034	18.2	15	100	4.1	53	49	18	69	45	29

– Ex. 11547 –

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-036	8.0	6	100	6.2	50	39	13	52	37	0
LD21-040	10.7	14	100	4.1	36	43	14	75	39	33
LD21-042	38.1	9	100	2.8	89	60	76	66	44	12
LD21-043	34.8	16	100	4.0	75	51	52	58	44	30
LD21-044	48.1	16	100	4.0	81	56	76	60	44	36
LD21-045	30.3	15	100	4.1	73	54	60	63	41	25
LD21-046	28.5	16	100	4.0	81	50	41	64	40	9
LD21-047	21.5	19	100	4.1	84	50	27	63	45	2
LD21-048	35.5	18	100	3.8	94	58	63	67	43	18
LD21-049	13.0	15	100	4.1	27	38	14	75	32	28
LD21-050	17.9	15	100	4.1	60	51	30	61	47	18
LD21-052	22.3	15	100	4.1	80	55	38	61	50	14
LD21-053	18.8	9	100	2.7	89	65	40	67	63	12
LD21-054	11.1	19	100	3.7	37	42	18	57	39	23
LD21-055	24.0	17	100	4.2	71	49	49	72	34	25
LD21-056	10.1	14	100	4.5	43	45	8	76	42	21
LD21-057	39.7	16	100	4.1	75	54	56	62	43	24
LD21-058	42.8	17	100	4.0	71	54	61	62	43	32
LD21-059	26.6	16	100	4.1	69	53	58	64	38	22
LD21-060	34.9	16	100	4.1	81	56	60	63	45	16
LD21-061	40.8	16	100	4.1	62	52	37	62	46	23
LD21-062	13.3	17	100	4.0	65	50	26	64	44	12
LD21-063	24.3	14	100	4.1	71	51	40	62	43	25
LD21-064	15.5	15	100	4.0	67	52	30	60	49	31
LD21-065	18.9	15	100	4.0	87	55	42	66	48	18
LD21-066	27.2	14	100	4.1	79	59	41	65	55	8
LD21-067	13.0	14	100	4.1	79	49	35	68	40	25
LD21-068	8.1	13	100	5.5	77	57	24	64	54	6

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-069	11.6	15	100	4.1	73	51	30	61	47	6
LD21-070	7.0	16	100	4.0	75	53	18	64	50	20
LD21-071	39.5	19	100	3.8	84	58	61	62	50	18
LD21-072	33.7	18	100	3.9	67	53	40	65	45	19
LD21-073	17.0	8	100	2.6	88	58	35	73	49	25
LD21-074	11.3	16	100	4.0	69	51	23	64	47	10
LD21-075	15.3	17	100	3.9	76	52	37	65	44	27
LD21-076	20.4	16	100	3.9	94	55	41	60	52	9
LD21-077	5.5	16	100	4.1	75	49	20	57	48	11
LD21-078	5.5	15	100	4.1	67	51	17	59	50	9
LD21-079	16.9	14	100	4.1	79	55	30	64	50	4
LD21-080	9.4	15	100	4.2	80	53	27	61	50	22
LD21-081	9.6	15	100	4.1	73	54	24	60	52	14
LD21-082	21.0	14	100	4.1	86	55	38	62	52	16
LD21-083	11.9	14	100	4.1	79	52	31	68	45	23
LD21-084	16.0	14	100	4.1	93	52	36	63	46	11
LD21-086	6.1	15	100	4.0	67	54	13	66	52	13
LD21-087	4.9	15	100	4.0	67	51	11	64	49	27
LD21-088	23.3	11	100	4.5	64	53	28	61	50	17
LD21-089	6.7	14	100	4.1	71	50	19	63	47	2
LD21-090	3.5	16	100	3.9	56	48	8	69	47	15
LD21-091	14.1	15	100	4.0	73	51	33	65	45	23
LD21-092	39.1	17	100	3.8	76	58	63	64	49	11
LD21-094	5.3	17	100	3.9	65	51	11	61	50	14
LD21-095	7.6	12	100	4.5	58	48	14	62	46	22
LD21-096	9.9	14	100	4.1	71	52	21	58	50	18
LD21-097	5.5	14	100	4.1	57	53	15	64	51	11
LD21-098	7.5	14	100	4.2	43	47	14	64	44	40

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
LD21-099	46.8	24	100	3.8	96	61	75	67	44	17
LD21-100	31.0	17	100	3.8	76	56	42	64	49	21
LD21-101	46.8	18	100	3.9	89	59	70	66	43	18
LD21-102	37.6	19	100	3.9	84	58	52	66	50	21
LD21-103	11.8	15	100	4.1	60	49	25	64	44	30
LD21-104	8.5	12	100	4.4	33	38	12	64	35	58
LD21-105	12.2	15	100	4.2	73	54	25	64	50	10
LD21-106	43.4	24	100	3.7	100	63	68	72	46	14
LD21-107	47.4	20	100	3.6	95	64	68	71	47	16
LD21-108	19.3	16	100	3.9	69	52	38	66	44	17
LD21-110	15.7	16	100	4.1	100	55	46	66	46	12
LD21-111	16.4	16	100	4.1	75	51	32	62	47	11
LD21-112	27.8	17	100	3.8	71	57	49	66	48	20
LD21-113	6.8	14	100	4.1	57	49	12	57	48	4
LD21-114	7.6	12	100	5.1	67	56	6	62	56	22
LD21-115	6.3	12	100	4.5	42	49	6	64	48	20
LD21-117	3.5	8	100	2.6	75	60	5	64	60	4
SD20-001	24.6	14	100	4.1	100	55	40	66	48	12
SD20-002	14.1	17	100	3.9	53	48	32	66	44	26
SD20-003	42.2	15	100	4.0	93	64	61	77	46	8
SD20-004	46.5	15	100	4.3	93	59	64	69	50	14
SD20-005	34.8	14	100	4.1	79	55	49	64	48	24
SD20-006	14.5	14	100	4.1	86	54	45	64	46	11
SD20-007	33.6	15	100	4.0	100	59	61	67	48	9
SD20-008	12.6	15	100	4.0	60	49	28	64	41	17
SD20-009	12.0	13	100	4.3	69	53	20	61	51	18
SD20-010	20.1	16	100	4.1	88	57	47	64	49	16
SD20-011	27.5	14	100	4.1	93	62	52	71	49	4

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD20-012	18.8	17	100	3.9	65	52	41	60	47	7
SD20-013	25.1	20	100	4.2	65	48	33	62	43	5
SD20-014	32.1	15	100	4.1	80	62	45	74	53	0
SD20-015	18.1	15	100	4.0	67	56	23	64	53	7
SD20-016	12.9	15	100	4.1	40	43	15	73	38	29
SD20-017	8.8	15	100	4.1	47	46	16	62	43	34
SD20-018	24.4	15	100	4.1	87	62	47	73	51	16
SD20-019	33.6	15	100	4.1	80	53	56	59	45	18
SD20-020	35.4	20	100	3.7	70	62	43	75	52	7
SD20-021	41.2	17	100	3.9	71	56	74	60	46	19
SD20-022	30.0	17	100	4.1	71	56	41	66	52	0
SD20-023	11.1	16	100	4.3	44	44	14	61	44	11
SD20-024	22.0	14	100	4.1	79	53	43	62	47	24
SD20-025	23.4	15	100	4.1	67	51	44	60	46	23
SD20-026	12.6	14	100	4.1	79	54	29	62	50	6
SD20-027	24.0	17	100	4.0	71	53	45	61	45	6
SD20-028	43.9	16	100	4.1	62	53	51	62	43	23
SD20-029	10.5	14	100	4.1	71	54	28	62	51	14
SD20-030	14.7	15	100	4.0	73	50	37	60	45	25
SD20-031	22.0	16	100	3.9	81	54	50	64	44	28
SD20-032	23.9	17	100	3.8	59	50	36	65	41	31
SD20-033	14.4	15	100	4.0	100	55	35	62	52	10
SD20-034	10.1	15	100	4.2	73	50	25	60	47	12
SD20-035	12.2	15	100	4.1	80	53	32	59	50	8
SD20-036	17.9	14	100	4.1	79	51	37	64	44	22
SD20-037	13.8	13	100	4.5	46	43	18	61	39	37
SD20-038	42.8	22	100	3.8	91	61	64	68	49	19
SD20-039	21.3	17	100	3.8	76	54	40	66	46	17

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD20-040	38.7	21	100	3.8	86	61	65	68	46	18
SD20-041	29.1	20	100	3.6	80	59	50	68	50	18
SD20-042	7.9	14	100	4.1	79	51	18	59	49	3
SD20-043	17.4	16	100	3.9	75	53	36	64	47	10
SD20-044	13.1	14	100	4.1	71	52	35	63	46	14
SD20-045	3.3	1	100	2.0	0	38	6	72	33	44
SD20-046	5.5	15	100	4.0	67	54	12	64	53	10
SD20-047	5.1	13	100	4.2	38	43	8	63	41	25
SD20-049	6.4	12	100	4.8	67	56	6	66	55	15
SD21-001	28.8	14	100	4.1	93	57	45	67	48	8
SD21-002	29.3	14	100	4.1	93	60	48	71	49	10
SD21-003	25.9	18	100	4.1	89	56	46	71	44	11
SD21-004	34.1	14	100	4.1	93	59	59	66	48	14
SD21-005	39.3	14	100	4.1	93	58	56	65	49	14
SD21-006	13.8	15	100	4.2	87	54	44	62	48	11
SD21-007	11.5	12	100	4.5	67	53	19	62	51	22
SD21-008	13.9	15	100	4.0	53	47	26	63	41	20
SD21-009	23.1	14	100	4.1	93	55	50	66	45	6
SD21-010	15.9	16	100	3.9	81	54	35	66	49	15
SD21-011	35.7	16	100	4.1	81	60	58	74	43	14
SD21-012	19.6	16	100	4.0	62	51	42	61	44	24
SD21-013	20.5	14	100	4.1	79	59	37	66	55	0
SD21-014	41.5	15	100	4.1	87	64	62	76	46	7
SD21-015	13.9	15	100	4.1	33	42	12	71	38	33
SD21-016	8.1	15	100	4.1	40	43	11	73	40	25
SD21-017	10.1	15	100	4.1	67	53	20	61	52	6
SD21-018	21.5	15	100	4.0	67	56	27	64	53	7
SD21-019	45.0	16	100	4.1	75	54	69	58	45	20

– Ex. 11551 –

Table 4: Primary Elections (contests with Black candidate) *(continued)*

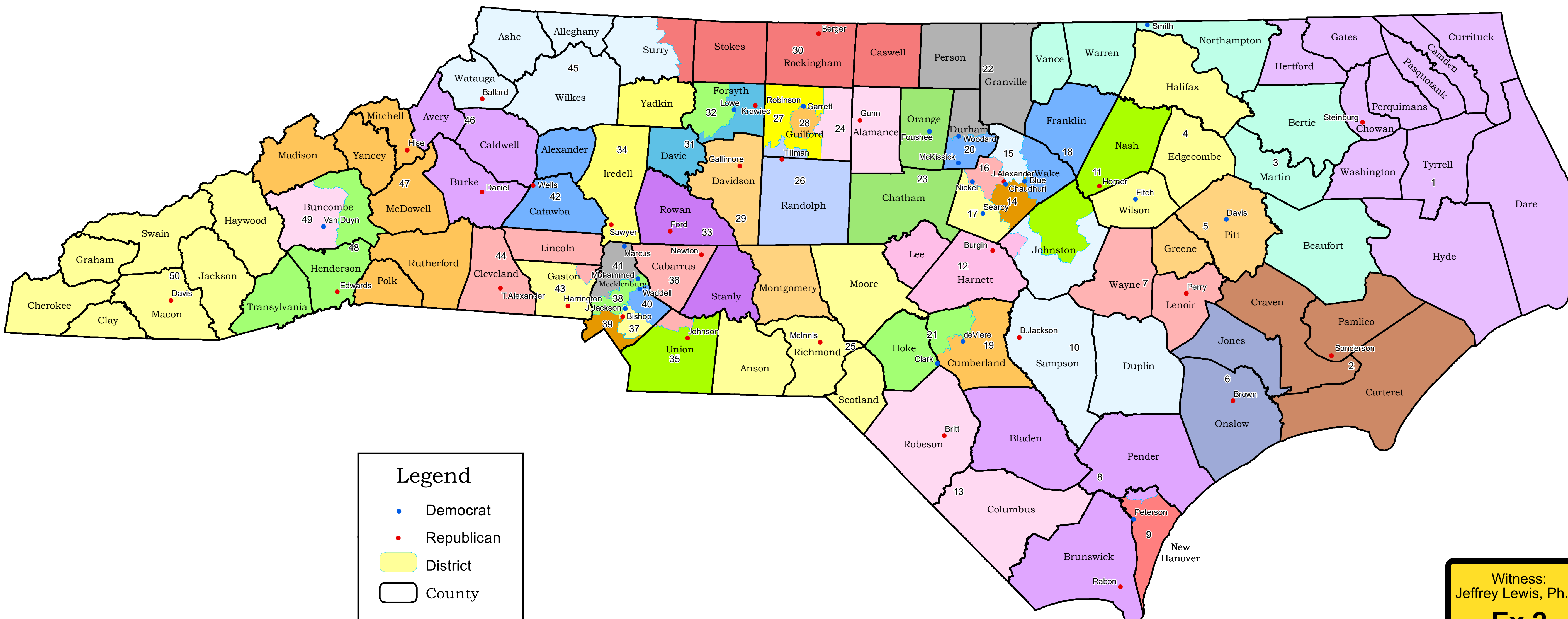
District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-020	26.2	17	100	4.0	65	55	34	77	47	8
SD21-021	18.3	15	100	4.1	60	49	41	60	43	6
SD21-022	33.2	19	100	3.7	74	61	38	74	52	8
SD21-023	16.0	17	100	4.1	47	46	23	58	44	30
SD21-024	28.4	18	100	4.1	78	51	43	70	41	9
SD21-025	17.1	14	100	4.1	79	53	34	60	50	22
SD21-026	16.8	15	100	4.0	73	54	39	61	49	29
SD21-027	26.2	16	100	4.1	62	52	36	63	45	16
SD21-028	49.5	16	100	4.1	81	55	65	62	42	23
SD21-029	17.3	14	100	4.1	79	49	39	64	40	25
SD21-030	8.8	14	100	4.1	79	55	24	61	53	13
SD21-031	11.5	16	100	4.0	69	48	30	64	41	26
SD21-032	33.8	18	100	3.9	67	52	47	63	43	30
SD21-033	14.4	15	100	4.0	100	55	35	62	52	9
SD21-034	18.9	16	100	3.9	81	54	38	62	49	4
SD21-035	11.1	15	100	4.1	80	53	30	60	50	8
SD21-036	4.2	15	100	4.0	53	48	10	64	45	16
SD21-037	10.7	14	100	4.1	64	51	24	60	48	13
SD21-038	33.4	20	100	3.6	90	61	56	70	49	16
SD21-039	39.0	21	100	3.6	90	62	66	69	47	15
SD21-040	47.5	21	100	3.8	100	63	72	68	48	18
SD21-041	10.0	12	100	4.4	50	44	20	63	40	32
SD21-042	20.3	15	100	4.2	67	55	27	64	52	12
SD21-043	17.9	16	100	3.9	75	53	37	64	47	10
SD21-044	12.7	15	100	4.3	73	51	35	64	43	14
SD21-045	7.1	14	100	4.1	79	54	18	59	52	2
SD21-046	4.6	14	100	4.1	57	51	7	69	49	8
SD21-048	5.2	15	100	4.0	53	46	9	58	45	3

Table 4: Primary Elections (contests with Black candidate) *(continued)*

District	Percent Black Voting Age Population	Number of Contests	Percent of Black-preferred candidates Democratic	Average Number of Candidates	Black-preferred win rate	Average Black-preferred candidate vote share	Avg. Pct. Voters Black	Avg. ER Black cohesion (pct.)	Avg. ER White crossover support (pct.)	Pct. Black needed for majority
SD21-049	6.9	12	100	4.8	67	56	7	65	55	15

EXHIBIT E

2019 Senate Consensus Nonpartisan Map



Senate Consensus Nonpartisan Map v3

0 25 50 100 150 200 Miles

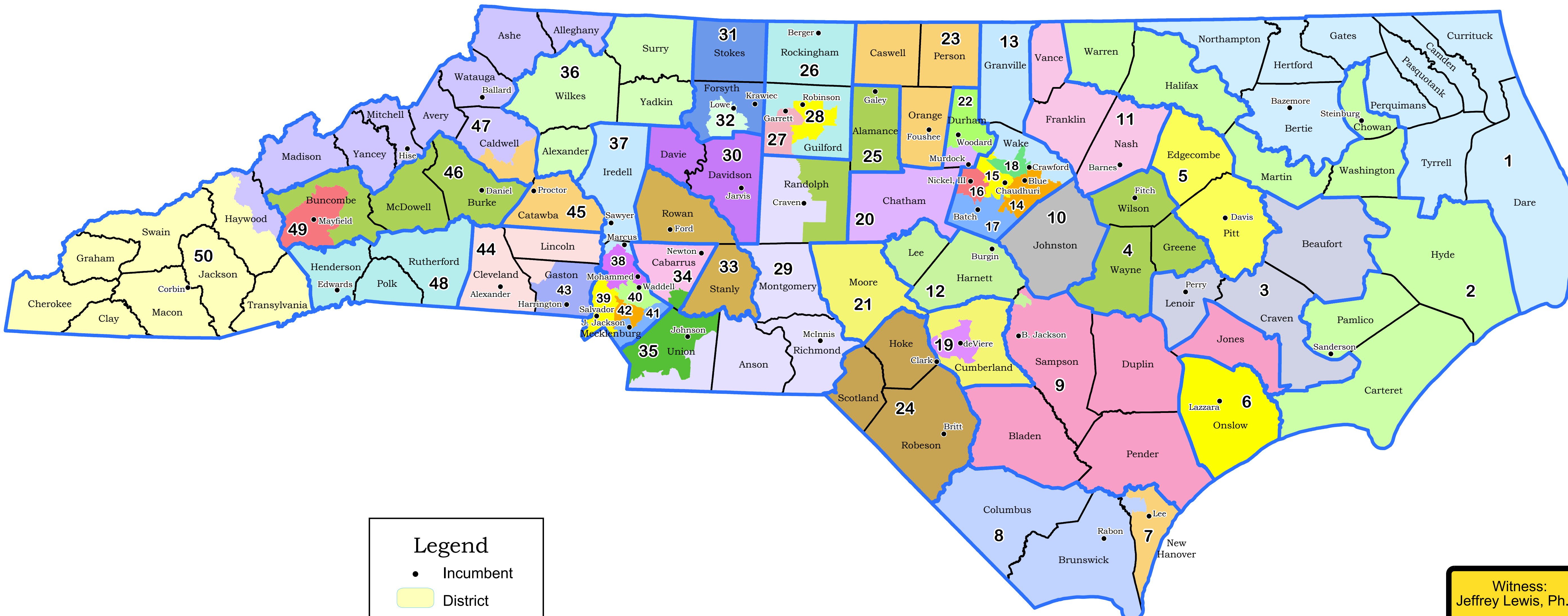
Printed by the NC General Assembly, September 13, 2019

Witness:
Jeffrey Lewis, Ph.D.
Ex 2
12/31/21 D. Myers Byrd

NCLCV v. Hall
21 CVS 15426
LDTX201

EXHIBIT D

S.L. 2021-173 Senate



Legend
- • Incumbent
- District
- County
- Groupings

N
W
E
S

0 25 50 100 150 200 Miles

Witness:
Jeffrey Lewis, Ph.D.
Ex 3
12/31/21 D. Myers Byrd

NCLCV v. Hall
21 CVS 15426
LDTX202

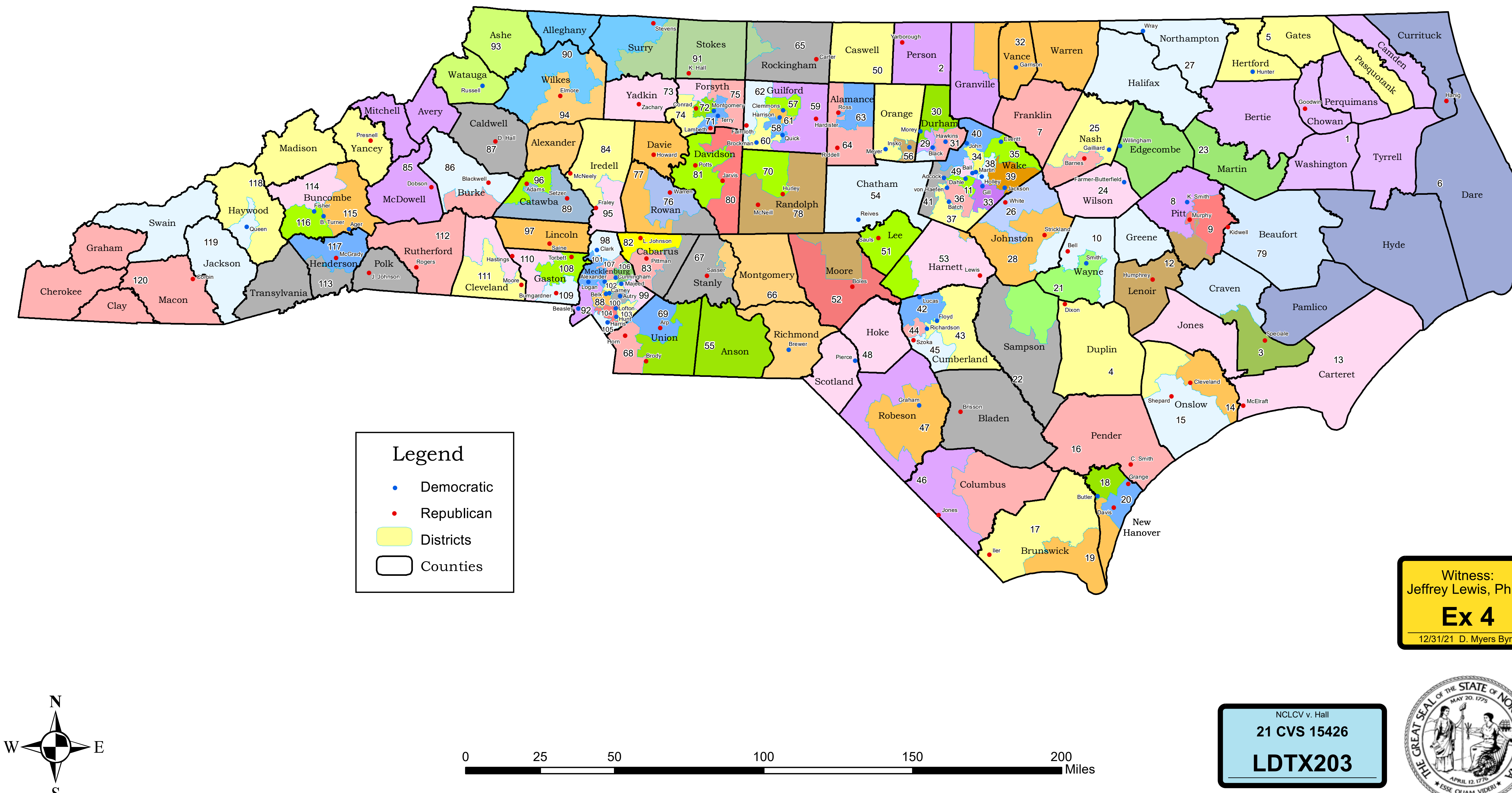
THE GREAT SEAL OF THE STATE OF NORTH CAROLINA
MAY 20, 1775
APRIL 12, 1776
ESSE QUAM VIDERI

Source: SL 2021-173 Senate

Printed by the NC General Assembly, November 4, 2021

EXIBIT C

HB 1020, 2nd Edition – 2019 House Remedial Map



HB 1020 H Red Comm CSBK-25

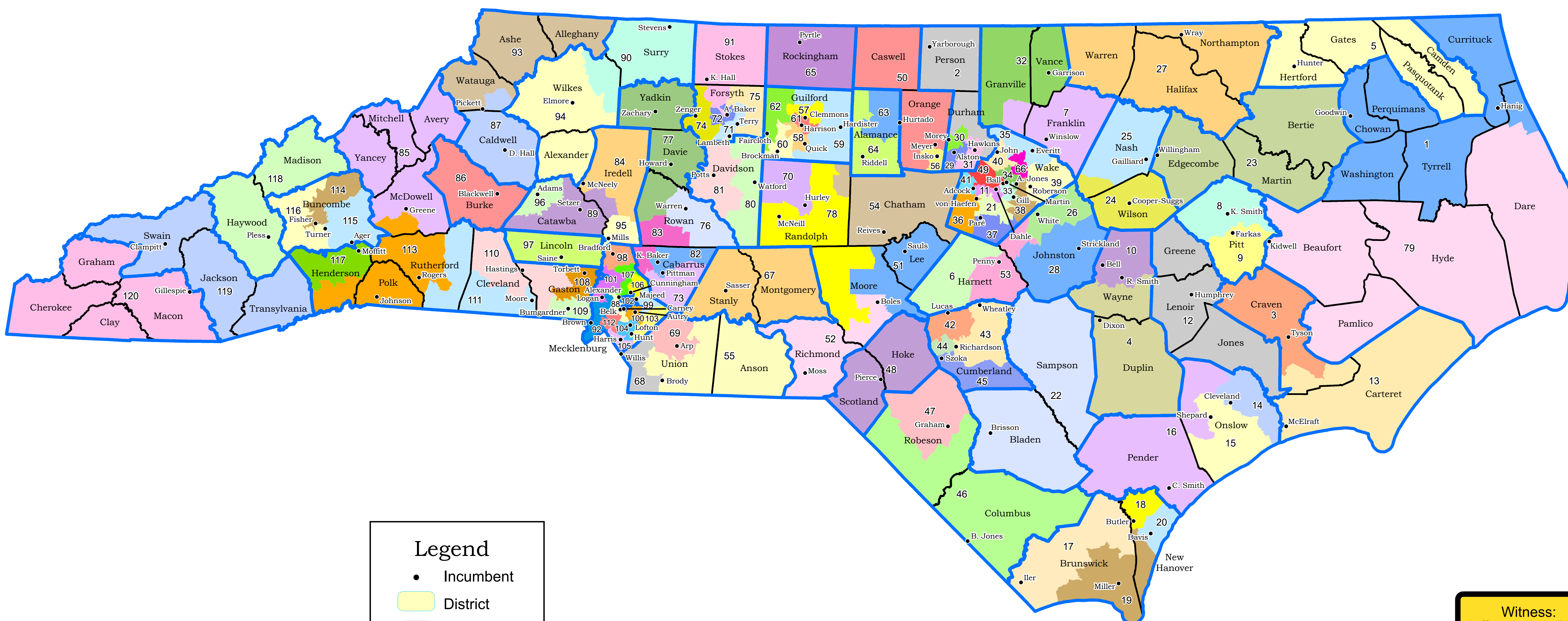
Printed by the NC General Assembly, September 13, 2019

Witness:
Jeffrey Lewis, Ph.D.
Ex 4
12/31/21 D. Myers Byrd

NCLCV v. Hall
21 CVS 15426
LDTX203

EXIBIT B

S.L. 2021-175 House



Legend
- • Incumbent
- District
- County
- Groupings

N W E S

0 25 50 100 150 200 Miles

Source: SL 2021-175 House

Printed by the NC General Assembly, November 4, 2021

Witness:
Jeffrey Lewis, Ph.D.
Ex 5
12/31/21 D. Myers Byrd

NCLCV v. Hall
21 CVS 15426
LDTX204

THE GREAT SEAL OF THE STATE OF NORTH CAROLINA MAY 20, 1775 APRIL 12, 1776 ESSE QUAM VIDERI

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
21 CVS 015426

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, INC., et al.,

REBECCA HARPER, et al.,

COMMON CAUSE,

Plaintiffs,

v.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.

Defendants.

AFFIDAVIT OF ROBERT PHILLIPS
EXECUTIVE DIRECTOR OF COMMON CAUSE NORTH CAROLINA

I, Robert "Bob" Phillips, swear under penalty of perjury that the following information is true to the best of my knowledge and state as follows:

1. I am a resident of Wake County, where I have lived since 1981. I am a native of Charlotte, North Carolina and have lived in the Triangle area for the past 45 years.

2. Since 2001, I have served as Executive Director of Common Cause North Carolina ("CCNC"), a state chapter of National Common Cause ("Common Cause"), which is a 501(c)(4) registered nonpartisan, nonprofit grassroots organization dedicated to upholding the core values of American democracy. Before becoming Executive Director of CCNC, I was hired as a full-time consultant to manage CCNC's 501(c)(3) grant awarded for nonpartisan public outreach and education on pro-democracy reforms. Prior to joining Common Cause, I worked as a local television journalist and Communications Director for the Office of Lieutenant Governor.

NCLCV v. Hall
21 CVS 15426
LDTX205

Witness:
Jeffrey Lewis, Ph.D.
Ex 6
12/31/21 D. Myers Byrd

3. As Executive Director of CCNC, I manage a diverse staff of eight people who work in the Triangle, Triad and Charlotte regions. I help design and implement policy and program priorities for Common Cause NC. I represent CCNC before the public, the media, decision-makers, and donors. I am also a registered lobbyist for Common Cause at the North Carolina General Assembly, and have worked with lawmakers on both sides of the aisle on matters related to redistricting reform.

4. I am authorized to speak for Common Cause in this case.

Common Cause Background

5. Since its founding in 1970, Common Cause has been dedicated to fair elections and making government at all levels more representative, open, and responsive to the interests of ordinary people. Common Cause regularly assists voters in understanding and navigating the election process, provides resources to help voters determine their districts and polling locations, and mobilizes voters to engage in political advocacy.

6. Common Cause has been one of the leading proponents of redistricting reform, conducting public education, advocacy, legislative lobbying, and participating in litigation in order to secure fair maps for all North Carolinians. Common Cause has been particularly active in efforts to curb partisan gerrymandering, working on legislative advocacy with both Democrats and Republicans in North Carolina for the past 20 years. Common Cause has also served as the lead plaintiff in multiple partisan gerrymandering lawsuits, including *Common Cause v. Rucho* in federal court and *Common Cause v. Lewis* in state court.

7. Partisan gerrymandering frustrates Common Cause's organizational mission of increasing democratic engagement and voter participation by insulating elected officials from the democratic process. When election results are preordained by partisan gerrymanders, voters are much less likely to contact their representatives, vote in elections, or engage in the democratic process. All of these effects directly impede Common Cause's organizational purpose.

Common Cause North Carolina Membership

8. As part of my Executive Director responsibilities, I oversee the maintenance of CCNC's statewide membership, supporter, and staff lists, records and information. Common Cause currently has over 25,000 members, staff, and supporters in North Carolina.

9. Based on my review and comparison of the Common Cause member database and with publicly available information in the North Carolina voter registration database, I am personally aware that Common Cause has members in the following counties as of October 2021 in the numbers indicated below, and do not have reason to believe these figures have changed appreciably since then:

    a. 310 members in Alamance County;

    b. 441 members in Brunswick County;

c. 2,005 members in Buncombe County;

d. 411 members in Cumberland County;

e. 136 members in Davidson County;

f. 1,717 members in Durham County;

g. 972 members in Forsyth County;

h. 1,540 members in Guilford County;

i. 198 members in Johnston County;

j. 2,441 members in Mecklenburg County;

k. 109 members in Nash County;

l. 743 members in New Hanover County;

m. 162 members in Onslow County;

n. 62 members in Robeson County;

o. 259 members in Union County;

p. 4,166 members in Wake County;

q. 79 members in Wayne County;

10. Common Cause members include voters who self-identify as Black throughout North Carolina. Based on my review of the Common Cause member database and of publicly available information in the North Carolina voter registration database, I am personally aware that we have members who have self-identified as Black in at least the following areas:

a. Bertie County;

b. Gates County;

c. Hertford County;

d. Hoke County;

e. Nash County;

f. Northampton County;

g. Pasquotank County;

h. Scotland County;

i. Wake County;

j. Wayne County; and

k. Wilson County.

11. CCNC's strength as an organization comes from our members and supporters. All across North Carolina, our members drive our efforts to hold those in power accountable, and to create public mechanisms and institutions that ensure that the people are the ones in charge. Our members staff our volunteer campaigns, call other North Carolinians and legislators alike to advocate for democracy-enabling policies, and power our movement forward. Nothing we do would be possible without our members.

12. Our members also help drive our efforts to assist voters in North Carolina to increase civic engagement. For example, the mission of CCNC's HBCU Student Action Alliance, launched in 2006, is to raise civic engagement among students of color at each of North Carolina's ten Historically Black Colleges and Universities (HBCUs). Additionally, we identify and nurture student leadership by selecting campus ambassadors whom we identify as our Democracy Fellows. Each Fellow receives a semester stipend for being our civic leader on their campus. Much of the HBCU campus work revolves around encouraging civic engagement, which includes registering to vote and voting in every election. Moreover, we strive to help every student understand that participating in democracy is more than just voting. We engage students to help us with our public education efforts and civic outreach activities, along with holding local elected officials accountable through contacts with their representatives.

The 2021 Redistricting Process

13. As part of my role as Executive Director of CCNC, I closely monitored the 2021 North Carolina redistricting process. My monitoring activities included physically attending meetings of the House Redistricting Committee and the Senate Redistricting and Elections Committee, attending public hearings, and watching livestreamed legislative meetings, as specified below, from August 2021 until the final maps were enacted in November 2021. This work was part of CCNC's initiative to amplify the transparency and accessibility of the redistricting process by educating our members and the public about the process and notifying them of opportunities to engage and provide input, such as the time(s) and location(s) of scheduled public hearings, the topics to be discussed at those hearings and the availability of draft maps for their review.

14. I am aware that the Legislative Defendants in this matter have insisted, both in public statements during the redistricting process and in litigation about this process, that the 2021 redistricting process was the most open and transparent process in North Carolina's history. Having worked in an advocacy role through three prior redistricting cycles and the remedial redistrictings this past decade, this assertion does not accurately reflect the process I personally experienced this year, both as a member of the public and as a nonpartisan advocate for voters.

15. From the beginning of this redistricting process, Common Cause advocated for a fair, transparent, timely, and inclusive redistricting process that would allow for meaningful public input. We understood that the delay in decennial census data (which is usually issued in the spring but was delayed until August this year) might require accommodations to the redistricting process, but given our experience in past redistricting cycles, we were confident that with adequate planning, it was still feasible to provide the public with a fulsome opportunity to provide input both before and after draft maps were publicly available. This would have enabled legislators to hear from the public on what types of maps would best serve their communities, as well as to hear feedback on proposed maps and, based on that feedback, make any changes necessary to ensure that communities across the state were adequately represented. Unfortunately, this is not the process that occurred.

16. The 2021 redistricting process was so riddled with obstacles to monitoring and engagement that I found myself – an experienced advocate who has followed many past iterations of redistricting – struggling to follow the process. These obstacles included late, inaccurate, and conflicting notices of scheduled public hearings from the House and Senate Committees on Redistricting, fewer public hearings than were provided in the 2011 redistricting process, and uncertainty as to whether/when the public would be given an opportunity to review and provide feedback on draft maps. Overall, it felt extremely chaotic and left advocates like those of us at Common Cause rushing last-minute to notify members of the public of when, where, and how they could provide input.

17. When public hearings were first proposed on August 18, 2021, legislative leaders announced that there would only be 10 public hearings before any draft maps were released.[1] This is in stark contrast to the dozens of public hearings held during the 2011 cycle.[2] After public pushback, the legislature announced a slightly expanded schedule of 13 public hearings on September 1, 2021, to be held from September 8 – 30.[3] This gave advocates and members of the public less than a week to prepare for the first hearing, with no indication of whether remote participation would be possible in light of COVID considerations. There was also no public information as to whether or not there would be any draft maps available during these hearings.

18. These obstacles caused unnecessary confusion and presented burdens to advocates like myself, as well as voters and other members of the public, many of whom expressed their eagerness to participate in these hearings to me directly. For example, the hearing location for the first public hearing on September 8, 2021, in Caldwell County was announced as the Caldwell Community College and Technical Institute.[4] But the actual location was at the J.E. Broyhill Civic Center Auditorium, which is in downtown Lenoir County and two miles from the college campus. I observed that this created great confusion amongst the

---

1 *See* https://ncleg.gov/documentsites/committees/House2021-182/2021/08-18-21/Chairs%20Potential%20Sites%20Handout%20v1.pdf

2 *See* https://www.ncleg.gov/Legislation/SupplementalDocs/2011/publichearings/redistricting

3 *See* https://www.ncleg.gov/documentsites/committees/House2021-182/2021/Public%20Hearing%20Schedule.pdf

4 *See* https://www.ncleg.gov/documentsites/committees/House2021-182/2021/Public%20Hearing%20Schedule.pdf

public who planned to attend. I showed up at the wrong location at Caldwell Community College, where I could not identify anyone who knew where the hearing would be. Signage directing people to the new site was so sparse that it took me 15 minutes of searching for information before I finally found it. In fact, I arrived to the community college campus at the same time Mecklenburg County House Representative Becky Carney did who was planning on being one of the lawmakers presiding over the hearing. She too had no idea at the time where the meeting was. After I finally made it to the J.E. Broyhill Civic Center Auditorium, I observed that a number of people who were called out to provide public comment did not appear to be present when their names were called to provide public comment. In fact, the first four people called upon were no shows, and I became the first speaker at number five. I could not help but wonder how many of the no shows were folks who, like me, did not have the correct location for the hearing.

19. This was not the only issue with the public hearing notices in September. The public hearing in Forsyth County on September 14 was also noticed with the wrong location. The legislature's schedule advertised this hearing's location as the Strickland Auditorium when in fact the hearing took place at the Dewitt Rhoades Conference Center in Winston Salem.

20. On another occasion, there was conflicting information about the same hearing posted by the House and Senate Committees. The legislature posted conflicting schedules on the House Redistricting Committee and Senate Redistricting Committee websites in mid-September 2021. These different schedules indicated different times for the same Robeson County hearing scheduled for September 28, 2021. It was only after community follow up that the correct time for the Robeson hearing was clarified.

21. The public hearing process concluded on September 28, 2021 with no indication of what would come next. Two days later, on September 30, 2021, the legislature noticed meetings of the House and Senate Redistricting Committees for the following week without a specific agenda. These are just a few examples of the obstacles that advocates and other members of the public were confronted with in their efforts to provide public comment before maps were drawn.

22. During the public comment period before there were any draft maps, I observed firsthand the passion many people expressed as they pleaded with lawmakers to draw fair maps, often making specific suggestions based on local knowledge of their community in these public hearings. But since the Chairs chose to limit public hearings to the period before there were any draft maps that citizens could examine and review, they were unable to provide any such comments specifically in response to actual proposed maps and how those maps would impact their communities. I believe this process significantly undermined citizens' ability to access their right to participate in the redistricting process. I also question whether the location and time choices deliberately excluded three of the largest metropolitan areas - including Raleigh, Greensboro, and Asheville - which I understand were directly impacted by the lines struck down as unlawful last cycle. Finally, these meetings were held in September, at a time when the Delta COVID-19 variant was rampant in North Carolina, and I knew many of the North Carolinians we engage in our work were eager to engage in the redistricting process without deviating from the CDC's advisory regarding the increased health risk associated with attending public gatherings in indoor

spaces. Yet lawmakers made no provisions to livestream a single public hearing in this series of meetings. There was no way for a citizen to watch or participate in real time from the safety of their home - yet "virtual participation" was provided at public meetings on the maps in late October.

Map-Drawing Process

23. On October 5, 2021, the House and Senate Redistricting Committees met separately, and I watched these on livestream. In both meetings, the respective Chairs announced the process legislators would have to use in drawing proposed state Legislative and Congressional maps. This included leaving specific committee rooms with four map-drawing computer stations open during business hours and allowing members to come in and, with the assistance of staff, draw maps at the stations. The Chairs did not indicate how long these stations would be available or how long the map-drawing process would extend, and did not provide lawmakers with any set deadline for when they had to draw and propose maps.

24. CCNC devoted multiple staff members to monitor the map drawing process in the General Assembly. This was part of our effort to provide some substantive transparency out of the surface-level transparency that the Chairs' redistricting process offered. However, the way in which the map-drawing was set up, with 10 live-stream cameras running more than 40 hours per week with no public information as to when legislators would be drawing maps, was daunting for our organization. We had to dedicate staff to monitoring these cameras at the expense of other use of this staff time and resources. Despite our best efforts and the increased resources we had to dedicate to this issue, we fell far short of being able to fully monitor and educate the public on the map-drawing process while it was happening.

25. These efforts were made all the more difficult by the various obstacles to in-person observation. Citizens were relegated to sitting in the back of the room in both committee meeting rooms where map-drawing occurred, where they had no ability to actually hear lawmakers or other individuals involved in the map drawing at work, or see what information they had brought with them to the map drawing computer stations. There was also no indication of who was seated at the work stations. I did not see anyone - lawmakers, nonpartisan staff, or partisan staff - make any effort to identify who they were or who was participating in the map-drawing. Additionally, watching the screens of each work station was also more confusing than it was informative, as maps would randomly appear, with lines shifting and various visual filters all changing rapidly without any context or explanation. In short, it felt like a waste of time to attend these sessions in person, and the times that I did go (early on in the process) I saw few if any members of the public in the room.

26. For these reasons, I strongly disagree that this process was transparent, given that members of the public did not know who was involved in drawing the maps, what information was being taken into the room or used while in the room, or the reasons certain lines were being drawn or altered at any particular time. Finally, while I was on-site during the map-drawing process, I observed lawmakers and others participating in the map-drawing process freely entering and exiting the committee rooms with papers and communications devices, including cell phones, and I saw nothing that would have hindered them from viewing

partisan or other data outside the committee room between map-drawing session, or from bringing in draft maps and materials with them from outside the room to the computer work station.

Limited public hearings on draft maps

25. Late on Wednesday, October 20, 2021, the General Assembly noticed two hearings for public comment: one on Monday, October 25, 2021 for the Congressional maps and one on Tuesday, October 26, 2021 for the Senate and House maps. The hearing notices did not specify which maps specifically would be discussed. This last-minute timing and lack of specifics gave members of the public very little opportunity to review, analyze, and prepare their public comment on the draft maps that had been publicly released, and made it very difficult for us at CCNC to notify the public about their ability to weigh in on map proposals. It also left exceedingly little time for that public comment to be incorporated into the maps that were passed shortly thereafter in the first week of November.

26. As in September, I observed that the North Carolinians attending the October public hearings were well-informed and passionate about conveying to lawmakers their desire to have fair maps, but I also observed confusion and frustration for members of the public who were unable to clearly identify which maps lawmakers were actually considering and would be voting on so they could provide comment on them. The sign-up process was also unnecessarily limited to less than 300 public speaking slots total across the two hearings - in a state of more than 10 million - to comment on legislative and Congressional maps that will be in place for the next decade. There was also no opportunity for citizens to sign up in the room of the in-person hearings. I believe this process failed to provide a meaningful opportunity for members of the public who wanted to speak to be able to do so.

RPV Analysis and NC NAACP v. Berger suit

27. During the process, my colleagues at CCNC and I grew increasingly concerned about the criteria prohibiting any use of racial data during redistricting, particularly as it prevented legislators from formally using data needed to protect voters of color in redistricting. This was especially concerning given the state's long history of targeting and discriminating against these voters in past redistricting cycles. When we saw the draft member-submitted map "SST-4" posted online, and particularly two of the proposed Senate Districts (marked Districts 1 and 9 on that map) we became concerned that Black voters in these areas would be deprived of the chance to re-elect their candidates of choice. We obtained a preliminary racially polarized voting analysis showing that Black voters would likely be unable to elect their candidates of choice as the result of racially polarized voting in these areas, and I sent this analysis via email to the legislative leaders, as well as the House and Senate Redistricting Committee members.

28. My hope was that the legislators would use this information to remedy these issues in the map, and to undertake additional analysis of racially polarized voting in North Carolina before enacting final maps. I sent this in part because the Chairs had indicated they would be open to viewing this type of information in committee meetings. This email is appended to this affidavit as **Exhibit A**. My understanding is that the legislators did not follow-up on

these issues even after receiving my email, or conduct any other analysis of racial data to mitigate the destruction of districts that perform for Black voters in the House and Senate maps.

29. We had serious concerns about this process, and therefore filed a complaint on October 29, 2021, asking for judicial review of this process and alleging that it would harm voters of color and specifically Black voters, including our own members and the voters we served. *See N.C. NAACP v. Berger*, No. 21 CVS 014776 (N.C. Super. Ct., Wake Cty.). We voluntarily withdrew our appeal of the dismissal of that complaint before asking to intervene in this matter after the maps were passed.

Vote on Final Maps

30. As the redistricting process wound toward a vote on final maps, the legislature's process continued to be wrought with obstacles to transparency. For example, the version of the state House bill filed on October 28, 2021 was just a placeholder that did not include any specific district lines. The proposed state House map was not posted on the General Assembly's website under "member-submitted maps" as would have been expected. In the November 1, 2021 House Redistricting Committee meeting, Chair Hall spoke at length about the transparency of the legislature's redistricting process. While he was making those comments, the proposed House map was not publicly available anywhere, including on the "Member Submitted Maps" page designated for posting the maps under consideration.

31. The final maps were passed very quickly over just a few days in early November. Overall, I found the entire process confusing and frustrating for its lack of context and transparency. My observation as an advocate who works with members of the public on civic engagement is that the average North Carolinian could not meaningfully have a voice in this process.

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

Executed on December 23, 2021.

Bob Phillips

Sworn and subscribed before me this 23rd day of December, 2021.

Notary Public

Name: Talia Ray

My commission expires: 11-6-2024

TALIA RAY
NOTARY PUBLIC
My Commission Expires November 6, 2024
MOORE COUNTY, NC

PHILLIPS AFFIDAVIT EXHIBIT A

From: Bob Phillips <bphillips@commoncause.org>
Subject: RPV Analysis for proposed SD9 and SD1 in member submitted map "SST-4"
Date: October 26, 2021 at 11:54:06 AM EDT
To: "Tim.Moore@ncleg.gov" <Tim.Moore@ncleg.gov>, "Grace.Irvin@ncleg.gov" <Grace.Irvin@ncleg.gov>, "Phil.Berger@ncleg.gov'" <Phil.Berger@ncleg.gov>, "Robin.Braswell@ncleg.gov" <Robin.Braswell@ncleg.gov>, "Warren.Daniel@ncleg.gov" <Warren.Daniel@ncleg.gov>, "Andy.Perrigo@ncleg.gov" <Andy.Perrigo@ncleg.gov>, "Ralph.Hise@ncleg.gov" <Ralph.Hise@ncleg.gov>, "Susan.Fanning@ncleg.gov" <Susan.Fanning@ncleg.gov>, "Paul.Newton@ncleg.gov" <Paul.Newton@ncleg.gov>, "Andrew.Stiffel@ncleg.gov" <Andrew.Stiffel@ncleg.gov>, "Destin.Hall@ncleg.gov" <Destin.Hall@ncleg.gov>, "Lucy.Harrill@ncleg.gov" <Lucy.Harrill@ncleg.gov>, "Dan.Blue@ncleg.gov" <Dan.Blue@ncleg.gov>, "Bonnie.McNeil@ncleg.gov" <Bonnie.McNeil@ncleg.gov>, "Robert.Reives@ncleg.gov" <Robert.Reives@ncleg.gov>, "Veronica.Green@ncleg.gov" <Veronica.Green@ncleg.gov>, "Ben.Clark@ncleg.gov" <Ben.Clark@ncleg.gov>, "Michael.Johnson@ncleg.gov" <Michael.Johnson@ncleg.gov>, "Don.Davis@ncleg.gov" <Don.Davis@ncleg.gov>, "Edwin.Woodard@ncleg.gov" <Edwin.Woodard@ncleg.gov>, "Chuck.Edwards@ncleg.gov" <Chuck.Edwards@ncleg.gov>, "Heather.Millett@ncleg.gov" <Heather.Millett@ncleg.gov>, "Carl.Ford@ncleg.gov" <Carl.Ford@ncleg.gov>, "Angela.Ford@ncleg.gov" <Angela.Ford@ncleg.gov>, "Kathy.Harrington@ncleg.gov" <Kathy.Harrington@ncleg.gov>, "Lorie.Byrd@ncleg.gov" <Lorie.Byrd@ncleg.gov>, "Brent.Jackson@ncleg.gov" <Brent.Jackson@ncleg.gov>, "William.Kirkley@ncleg.gov" <William.Kirkley@ncleg.gov>, "Joyce.Krawiec@ncleg.gov" <Joyce.Krawiec@ncleg.gov>, "Debbie.Lown@ncleg.gov" <Debbie.Lown@ncleg.gov>, "Paul.Lowe@ncleg.gov" <Paul.Lowe@ncleg.gov>, "Corneisha.Mitchell@ncleg.gov" <Corneisha.Mitchell@ncleg.gov>, "Natasha.Marcus@ncleg.gov" <Natasha.Marcus@ncleg.gov>, "Jessica.Bolin@ncleg.gov" <Jessica.Bolin@ncleg.gov>, "Wiley.Nickel@ncleg.gov" <Wiley.Nickel@ncleg.gov>, "Michael.Cullen@ncleg.gov" <Michael.Cullen@ncleg.gov>, "Jim.Perry@ncleg.gov" <Jim.Perry@ncleg.gov>, "LeighAnn.Biddix@ncleg.gov" <LeighAnn.Biddix@ncleg.gov>, "Bill.Rabon@ncleg.gov" <Bill.Rabon@ncleg.gov>, "Paula.Fields@ncleg.gov" <Paula.Fields@ncleg.gov>, "William.Richardson@ncleg.gov" <William.Richardson@ncleg.gov>, "Leigh.Lawrence@ncleg.gov" <Leigh.Lawrence@ncleg.gov>, "Jason.Saine@ncleg.gov" <Jason.Saine@ncleg.gov>, "MaryStuart.Sloan@ncleg.gov" <MaryStuart.Sloan@ncleg.gov>, "John.Torbett@ncleg.gov" <John.Torbett@ncleg.gov>, "Viddia.Torbett@ncleg.gov" <Viddia.Torbett@ncleg.gov>, "Cecil.Brockman@ncleg.gov" <Cecil.Brockman@ncleg.gov>, "Matthew.Barley@ncleg.gov" <Matthew.Barley@ncleg.gov>, "Becky.Carney@ncleg.gov" <Becky.Carney@ncleg.gov>, "Beth.LeGrande@ncleg.gov" <Beth.LeGrande@ncleg.gov>, "Linda.Cooper-Suggs@ncleg.gov" <Linda.Cooper-Suggs@ncleg.gov>, "Caroline.Enloe@ncleg.gov" <Caroline.Enloe@ncleg.gov>, "Jimmy.Dixon@ncleg.gov" <Jimmy.Dixon@ncleg.gov>, "Michael.Wiggins@ncleg.gov" <Michael.Wiggins@ncleg.gov>, "Jon.Hardister@ncleg.gov" <Jon.Hardister@ncleg.gov>, "Jayne.Nelson@ncleg.gov" <Jayne.Nelson@ncleg.gov>, "Pricey.Harrison@ncleg.gov" <Pricey.Harrison@ncleg.gov>, "Mary.Lee@ncleg.gov" <Mary.Lee@ncleg.gov>, "Kelly.Hastings@ncleg.gov" <Kelly.Hastings@ncleg.gov>, "Sophia.Hastings@ncleg.gov" <Sophia.Hastings@ncleg.gov>, "Zack.Hawkins@ncleg.gov" <Zack.Hawkins@ncleg.gov>, "Anita.Wilder@ncleg.gov" <Anita.Wilder@ncleg.gov>, "Brenden.Jones@ncleg.gov" <Brenden.Jones@ncleg.gov>, "Jeff.Hauser@ncleg.gov" <Jeff.Hauser@ncleg.gov>, "Grey.Mills@ncleg.gov" <Grey.Mills@ncleg.gov>, "Mason.Barefoot@ncleg.gov" <Mason.Barefoot@ncleg.gov>, "David.Rogers@ncleg.gov" <David.Rogers@ncleg.gov>, "Misty.Rogers@ncleg.gov" <Misty.Rogers@ncleg.gov>, "John.Szoka@ncleg.gov" <John.Szoka@ncleg.gov>, "Beverly.Slagle@ncleg.gov" <Beverly.Slagle@ncleg.gov>, "Harry.Warren@ncleg.gov" <Harry.Warren@ncleg.gov>, "Cristy.Yates@ncleg.gov" <Cristy.Yates@ncleg.gov>, "Lee.Zachary@ncleg.gov" <Lee.Zachary@ncleg.gov>, "Martha.Jenkins@ncleg.gov" <Martha.Jenkins@ncleg.gov>

Subject: RPV Analysis for proposed SD9 and SD1 in member submitted map "SST-4"

Dear Senators and Representatives,

Attached are analyses of recent state-wide election results in the proposed SD9 and SD1 as drawn in the member submitted map "SST-4" that we believe are indicative of racially polarized voting in these jurisdictions. We strongly urge the House and Senate Redistricting Committees to consider this information, and to take care this redistricting cycle to ensure that House and Senate maps do not dilute the voting power of voters of color, particularly for voters in Northeast North Carolina.

RPV in SD1 in SST4 Bertie-Camden-Currituck-Dare-Gates-Hertford-Northampton-Pasquotank-Perquimans-Tyrrell (Ernestine Bazemore)

	Beasley vs. Newby - NC Supreme Court 2020GEN								
	Homogeneous Precinct Analysis		Bivariate Ecological Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (0)	≥ 90% White Precincts (18)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Beasley		34.58%	90.74%	27.00%	98.71%	21.02%	95.80%	23.69%	46.55%
Newby		65.42%	9.26%	73.00%	1.86%	78.94%	4.20%	76.31%	53.45%

	Holmes vs. Dobson - NC Commissioner of Labor 2020GEN								
	Homogeneous Precinct Analysis		Bivariate Ecological Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (0)	≥ 90% White Precincts (18)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Holmes		33.59%	91.96%	26.15%	98.61%	20.31%	96.41%	22.50%	46.40%
Dobson		66.41%	8.04%	73.85%	0.98%	79.73%	3.59%	77.50%	53.60%

	Blue vs. Folwell - NC Treasurer 2016GEN								
	Homogeneous Precinct Analysis		Bivariate Ecological Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (1)	≥ 90% White Precincts (25)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Blue	93.86%	34.11%	93.41%	26.70%	98.79%	24.05%	97.19%	25.73%	48.07%
Folwell	6.14%	65.89%	6.59%	73.31%	0.79%	75.90%	2.81%	74.27%	51.93%

	Coleman vs. Forest vs. Cole - Lt. Governor 2016GEN								
	Homogeneous Precinct Analysis		Bivariate Ecological Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (1)	≥ 90% White Precincts (25)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Coleman	93.69%	33.83%	91.15%	25.49%	98.16%	22.79%	90.05%	27.98%	46.58%
Forest	5.74%	62.71%	8.85%	74.51%	1.16%	74.73%	9.13%	70.36%	50.98%
Cole	0.56%	3.47%			0.57%	3.42%	0.82%	1.66%	2.44%

RPV in SD9 in SST-4 Greene-Wayne-Wilson (Milton "Toby" Fitch Jr.)

Beasley vs. Newby - NC Supreme Court 2020GEN

	Homogeneous Precinct Analysis		Bivariate Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (1)	≥ 90% White Precincts (0)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Beasley	94.90%		99.31%	18.74%	98.69%	8.57%	97.28%	10.60%	48.28%
Newby	5.10%		0.69%	81.26%	1.13%	91.40%	2.72%	89.40%	51.72%

Holmes vs. Dobson - NC Commissioner of Labor 2020GEN

	Homogeneous Precinct Analysis		Bivariate Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (1)	≥ 90% White Precincts (0)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Holmes	95.87%		100.00%	16.96%	99.11%	7.29%	97.89%	8.67%	47.68%
Dobson	4.13%		0.00%	83.04%	0.02%	92.70%	2.11%	91.33%	52.32%

Blue vs. Folwell - NC Treasurer 2016GEN

	Homogeneous Precinct Analysis		Bivariate Regression		King's Iterative EI		RxC EI		Percent Vote
	≥ 90% Black Precincts (2)	≥ 90% White Precincts (1)	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	Support from Black Voters	Support from White Voters	
Blue	96.55%	15.82%	100.00%	17.62%	99.02%	13.55%	97.40%	15.83%	48.71%
Folwell	3.45%	84.18%	0.00%	82.38%	0.84%	86.28%	2.60%	84.17%	51.29%

Coleman vs. Forest vs. Cole - Lt. Governor 2016GEN

<table>
<tr><th></th><th colspan="2">Homogeneous Precinct Analysis</th><th colspan="2">Bivariate Regression</th><th colspan="2">King's Iterative EI</th><th colspan="2">RxC EI</th><th rowspan="2">Percent Vote</th></tr>
<tr><th></th><th>≥ 90% Black Precincts (2)</th><th>≥ 90% White Precincts (1)</th><th>Support from Black Voters</th><th>Support from White Voters</th><th>Support from Black Voters</th><th>Support from White Voters</th><th>Support from Black Voters</th><th>Support from White Voters</th></tr>
<tr><td>Coleman</td><td>96.76%</td><td>13.79%</td><td>99.86%</td><td>14.28%</td><td>99.19%</td><td>9.91%</td><td>83.13%</td><td>22.97%</td><td>46.32%</td></tr>
<tr><td>Forest</td><td>2.19%</td><td>84.90%</td><td rowspan="2">0.14%</td><td rowspan="2">85.72%</td><td>0.90%</td><td>87.47%</td><td>16.19%</td><td>76.55%</td><td>51.96%</td></tr>
<tr><td>Cole</td><td>1.05%</td><td>1.31%</td><td>1.68%</td><td>1.80%</td><td>0.67%</td><td>0.48%</td><td>1.72%</td></tr>
</table>

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
21 CVS 015426, 21 CVS 500085

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, INC.; HENRY M. MICHAUX, JR., et al.,

Plaintiffs,

REBECCA HARPER, et al.,

Plaintiffs,

v.

REPRESENTATIVE DESTIN HALL, in his official capacity as Chair of the House Standing Committee on Redistricting, et al.,

Defendants.

AFFIDAVIT OF PROFESSOR MOON DUCHIN

NCLCV v. Hall
21 CVS 15426
LDTX206

Witness:
Jeffrey Lewis, Ph.D.
Ex 7
12/31/21 D. Myers Byrd

I, Dr. Moon, Duchin, having been duly sworn by an officer authorized to administer oaths, depose and state as follows:

1. I am over 18 years of age, legally competent to give this Affidavit, and have personal knowledge of the facts set forth in this Affidavit.
2. All of the quantitative work described in this Affidavit was performed by myself with the support of research assistants working under my direct supervision.

Background and qualifications

3. I hold a Ph.D. and an M.S in Mathematics from the University of Chicago as well as an A.B. in Mathematics and Women's Studies from Harvard University.
4. I am a Professor of Mathematics and a Senior Fellow in the Jonathan M. Tisch College of Civic Life at Tufts University.
5. My general research areas are geometry, topology, dynamics, and applications of mathematics and computing to the study of elections and voting. My redistricting-related work has been published in venues such as the Election Law Journal, Political Analysis, Foundations of Data Science, the Notices of the American Mathematical Society, Statistics and Public Policy, the Virginia Policy Review, the Harvard Data Science Review, Foundations of Responsible Computing, and the Yale Law Journal Forum.
6. My research has had continuous grant support from the National Science Foundation since 2009, including a CAREER grant from 2013–2018. I am currently on the editorial board of the journals Advances in Mathematics and the Harvard Data Science Review. I was elected a Fellow of the American Mathematical Society in 2017 and was named a Radcliffe Fellow and a Guggenheim Fellow in 2018.
7. A current copy of my full CV is attached to this report.
8. I am compensated at the rate of $400 per hour.

Analysis of 2021 enacted redistricting plans in North Carolina

Moon Duchin
Professor of Mathematics, Tufts University
Senior Fellow, Tisch College of Civic Life

December 23, 2021

1 Introduction

On November 4, 2021, the North Carolina General Assembly enacted three districting plans: maps of 14 U.S. Congressional districts, 50 state Senate districts, and 120 state House districts. This affidavit contains a brief summary of my evaluation of the properties of these plans. My focus will be on the egregious partisan imbalance and racial vote dilution in the enacted plans, following a brief review of the traditional districting principles.

Because redistricting inevitably involves complex interactions of rules, which can create intricate tradeoffs, it will be useful to employ a direct comparison to an alternative set of plans. These demonstrative plans illustrate that it is possible to *simultaneously maintain or improve* metrics for all of the most important redistricting principles that are operative in North Carolina's constitution and state and federal law. Crucially, this shows that nothing about the state's political geography compels us to draw a plan with a massive and entrenched partisan skew or a significant dilutive effect on Black voters.

To this end, I will be comparing the following plans: the enacted plans SL-174, SL-173, and SL-175 and a corresponding set of alternative plans labeled NCLCV-Cong, NCLCV-Sen, and NCLCV-House (proposed by plaintiffs who include the North Carolina League of Conservation Voters). The accompanying block assignment files are Appendices A1, A2, A3 to this affidavit, and I understand that they will be provided to the court in native format.

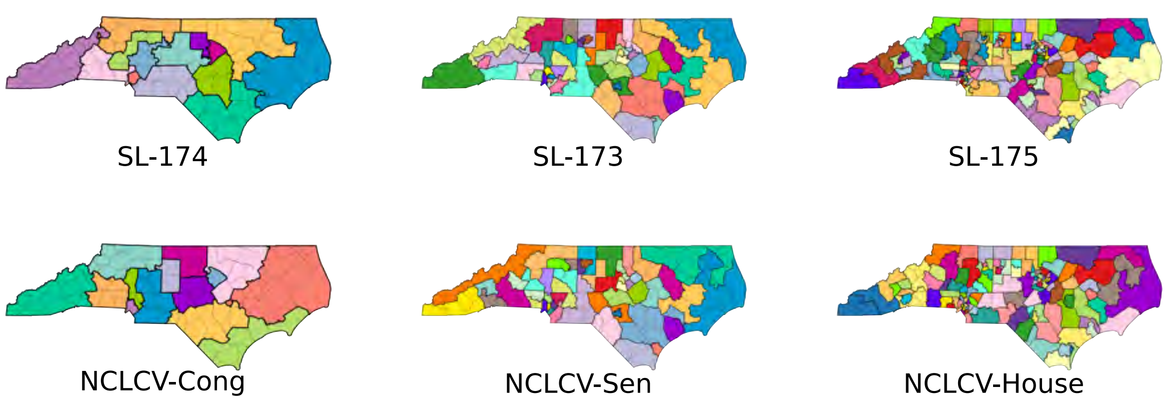


Figure 1: The six plans under discussion in this affidavit.

2 Partisan gerrymandering

2.1 Abstract partisan fairness

There are many notions of partisan fairness that can be found in the scholarly literature and in redistricting practitioner guides and software. Most of them are numerical, in the sense that they address *how a certain quantitative share of the vote should be translated to a quantitative share of the seats* in a state legislature or Congressional delegation.

The numerical notions of partisan fairness all tend to agree on one central point: an electoral climate with a roughly 50-50 split in partisan preference should produce a roughly 50-50 representational split. I will call this the *Close-Votes-Close-Seats* principle. North Carolina voting has displayed a partisan split staying consistently close to even between the two major parties over the last ten years, but the plans released by the General Assembly after the 2010 census were very far from realizing the ideal of converting even voting to even representation. This time, with a 14th seat added to North Carolina's apportionment, an exactly even seat outcome is possible. But the new enacted plans, like the plans from ten years ago, are decidedly not conducive to even representation.

Importantly, Close-Votes-Close-Seats is not tantamount to a requirement for proportionality. Rather, it is closely related to the principle of *Majority Rule*: a party or group with more than half of the votes should be able to secure more than half of the seats. In fact, Close-Votes-Close-Seats is essentially a corollary (or byproduct) of Majority Rule. It is not practicable to design a map that *always* attains these properties, but by contrast a map that *consistently thwarts* them should be closely scrutinized and usually rejected.

Unlike proportionality, neither Close-Votes-Close-Seats nor Majority Rule has any bearing on the preferred representational outcome when one party has a significant voting advantage: these principles are silent about whether 70% vote share should secure 70% of the seats, as proportionality would dictate, or 90% of the seats, as supporters of the efficiency gap would prefer. The size of the "winner's bonus" is not at all prescribed by a Close-Votes-Close-Seats norm.

2.2 Geography and fairness

Some scholars have argued that all numerical ideals, including Close-Votes-Close-Seats, ignore the crucial *political geography*—this school of thought reminds us that the location of votes for each party, and not just the aggregate preferences, has a major impact on redistricting outcomes. In [5], my co-authors and I gave a vivid demonstration of the impacts of political geography in Massachusetts: we showed that for a ten-year span of observed voting patterns, even though Republicans tended to get over one-third of the statewide vote, it was impossible to draw a single Congressional district with a Republican majority. That is, the geography of Massachusetts Republicans locked them out of Congressional representation. It is therefore not reasonable to charge the Massachusetts legislature with gerrymandering for having produced maps which yielded all-Democratic delegations; they could not have done otherwise.

In North Carolina, this is not the case. The alternative plans demonstrate that it is possible to produce maps that give the two major parties a roughly equal opportunity to elect their candidates. These plans are just examples among many thousands of plausible maps that convert voter preferences to far more even representation by party. In Congressional redistricting, present-day North Carolina geography is easily conducive to a seat share squarely in line with the vote share. In Senate and House plans, even following the strict detail of the Whole County Provisions, there are likewise many alternatives converting nearly even voting patterns to nearly even representation, across a large set of recent elections.

The clear conclusion is that the political geography of North Carolina today does not obstruct the selection of a map that treats Democratic and Republican voters fairly and even-handedly.

2.3 Overlaying elections and plans

The enacted plans behave as though they are built to resiliently safeguard electoral advantage for Republican candidates. We can examine this effect without invoking any predictions or assumptions about future voting behavior by using a standard technique in election analysis: pairing proposed plans with actual recent elections. This method works by overlaying (or superimposing) the districting plans on a series of observed voting patterns from the recent past; this lets us take advantage of the rich dataset of real electoral outcomes in North Carolina in the last ten years to avoid speculative or predictive modeling about voting trends in the future.[1]

The overlay method works best when there is a large set of statewide elections to apply, which is certainly true in North Carolina. Of the 52 statewide party-ID general elections from the last cycle, 29 are elections for Council of State (ten offices elected three times, with the Attorney General race uncontested in 2012), three are presidential races, three are for U.S. Senate, and 17 are judicial races since mid-decade, when those became partisan contests. See Table 1 for more detail on the election dataset.

2.4 Partisanship outcomes

North Carolina is a very "purple" state. In 38 out of the 52 contests in our dataset, the statewide partisan outcome is within a 6-point margin: 47-53 or closer.

To understand how the enacted plans create major shortfalls for Democratic representation, we will overlay the plans with voting patterns from individual elections in the past Census cycle. We can make a striking observation by laying our six plans over the vote patterns, shown in Table 1. This reveals that the enacted Congressional plan (SL-174) shows a remarkable lack of responsiveness, giving 10–4 partisan outcomes across a wide range of recent electoral conditions, meaning that 10 Republicans and only 4 Democrats would represent North Carolina in Congress. The alternative plan (NCLCV-Cong) is far more faithful to the vote share, far more responsive, and tends to award more seats to the party with more votes—usually upholding both basic small-d-democratic principles of Majority Rules and Close-Votes-Close-Seats, which are violated by the enacted plan.

The same patterns are visible at the Senate and House level. Overall, the three enacted plans combine with those 38 relatively even vote patterns to produce 114 outcomes. Every single pairing of an enacted plan with a close statewide contest—a complete sweep of 114 opportunities—gives an *outright Republican majority* of seats. All three enacted plans will lock in an extreme, resilient, and unnecessary advantage for one party.

By every measure considered above that corresponds to a clear legal or good-government redistricting goal or value, the alternative plans meet or exceed the performance of the enacted plans. This demonstrates that it is possible, without any cost to the redistricting principles in play, to select maps that are far fairer to the voters of North Carolina.

Below, the outcomes of overlaying the plans on the elections will be presented in a series of tables and figures. First, Table 1 overviews the overlays with numbers.[2] Then, Figure 2 offers a visualization to depict the same big picture of entrenched partisan advantage in the enacted plans with the full 52-election dataset. The diagonals show various lines of *responsiveness* that pivot around the central point of fairness: half of the votes securing half of the seats.

Finally, we will restrict to a smaller set of the 14 "up-ballot" races and consider the comparison for one office at a time in Figures 3-5.

[1] Many authors have used this technique of overlaying "exogenous" statewide elections rather than using statistical regressions and other modeling to manipulate "endogenous" districted elections. For instance this can be found in peer-reviewed work and expert reports of scholar-practitioners such as Bernard Grofman and Steven Ansolabehere.

[2] The backup data supporting Table 1 is attached to this report as Appendix C and I understand that it will be provided to the court in native format.

Do close votes translate to close seats?

The table records the number of districts in each plan with a Democratic win. This shows that the enacted maps systematically violate the principles of Close-Votes-Close-Seats and Majority Rule.

53 — 47 or closer (highlighted rows SEN16 through GOV20)

	D Vote Share	SL-174	NCLCV-Cong	SL-173	NCLCV-Sen	SL-175	NCLCV-House
GOV12	0.4418	4	4	16	18	41	44
AGC16	0.4444	4	4	17	17	40	42
LAC16	0.4475	4	5	18	20	42	45
JHU16	0.4563	4	5	18	19	42	49
AGC20	0.4615	3	4	17	19	40	51
JZA16	0.4619	4	5	19	21	43	50
JDI16	0.4653	4	6	19	21	44	53
LTG16	0.4665	4	6	19	21	44	54
LAC12	0.4674	4	5	20	20	44	51
AGC12	0.4678	4	5	18	18	43	50
SEN16	0.4705	4	6	19	21	43	55
TRS16	0.4730	4	6	19	21	45	53
TRS20	0.4743	4	6	17	20	45	51
JA620	0.4806	4	7	17	21	46	55
PRS16	0.4809	4	7	19	22	48	56
JA420	0.4822	4	7	17	22	47	56
INC20	0.4823	4	7	18	23	47	56
LTG20	0.4836	4	7	18	21	46	55
JA720	0.4842	4	7	17	22	48	56
SUP20	0.4862	4	7	19	23	49	56
JA520	0.4874	4	7	18	22	49	57
JA218	0.4876	4	7	18	22	45	55
JS420	0.4879	4	7	19	24	49	56
J1320	0.4885	4	7	19	23	49	56
PRS12	0.4897	4	6	20	21	46	55
SEN20	0.4910	4	7	20	24	48	56
LAC20	0.4918	4	8	21	25	51	58
SEN14	0.4919	4	6	20	22	46	52
PRS20	0.4932	4	8	20	25	50	60
JS220	0.4934	4	8	21	24	51	59
SUP16	0.4941	4	6	22	23	49	57
JS118	0.4955	4	7	20	25	50	58
INC16	0.4960	4	6	22	22	50	57
JST16	0.4976	4	7	21	23	50	58
LTG12	0.4992	5	7	22	22	50	58
JS120	0.5000	4	8	22	27	52	60
AUD16	0.5007	5	8	22	23	51	56
GOV16	0.5011	4	7	20	27	50	58
ATG20	0.5013	4	8	21	25	51	58
ATG16	0.5027	4	7	20	23	50	57
JA118	0.5078	4	8	22	26	51	58
AUD20	0.5088	4	8	24	28	54	61
JA318	0.5091	4	8	21	26	52	59
SOS20	0.5116	5	8	24	28	53	62
JGE16	0.5131	5	8	22	25	52	59
INC12	0.5186	5	8	22	22	55	61
SOS16	0.5226	5	9	24	24	57	62
GOV20	0.5229	4	8	23	27	58	63
AUD12	0.5371	8	9	27	28	61	65
SOS12	0.5379	7	9	26	26	59	63
TRS12	0.5383	7	9	25	24	59	65
SUP12	0.5424	8	9	28	28	61	66

AGC = Agriculture Commissioner; ATG = Attorney General; AUD = Auditor; GOV = Governor; INC = Insurance Commissioner; LAC = Labor Commissioner; LTG = Lieutenant Governor; PRS = President; SEN = Senator; SOS = Secretary of State; SUP = Superintendent of Public Instruction; TRS = Treasurer. The prefix JA* refers to judicial elections to the Court of Appeals (so that, for instance, JA118 is the election to the Seat 1 on the Court of Appeals in 2018), JS* are elections to the state Supreme Court. All other J* prefixes refer to an election to replace a specific judge on the Court of Appeals. Where there was more than one judicial candidate from a given party on the ballot, they were combined for this analysis. The two-digit suffix designates the election year.

Table 1: 52 general elections, sorted from lowest to highest Democratic share.

Seats vs. Votes

Majority Rule says that outcomes should tend to fall in the Northeast and Southwest quadrants, avoiding the Southeast and Northwest. Close-Votes-Close-Seats says that points should not miss the bulls-eye near the center by systematically deviating to the North or the South. These principles are clearly upheld by the alternative plans (**green**) and violated by the enacted plans (**maroon**).

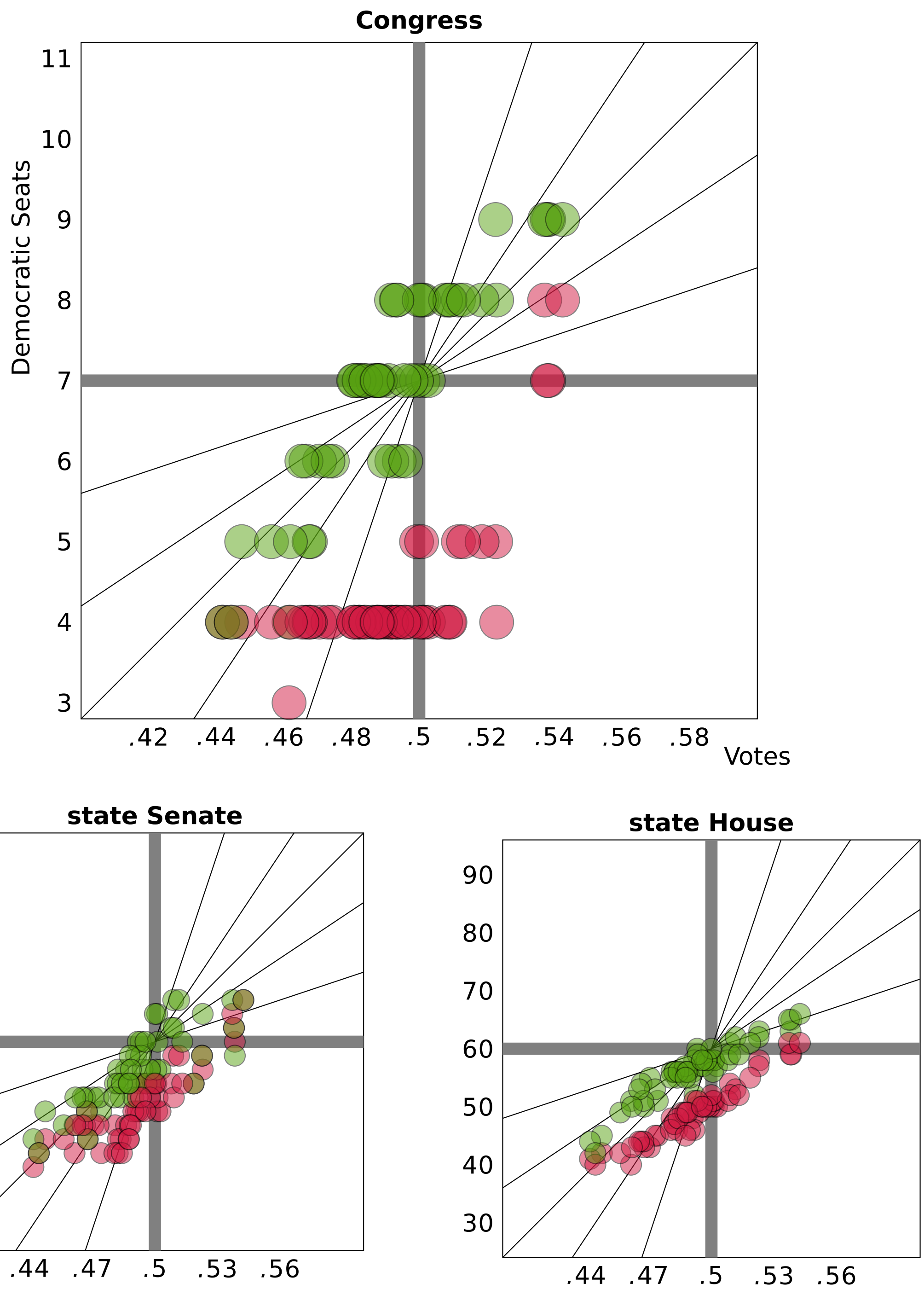


Figure 2: On these seats-vs.-votes plots, we see the election results when overlaying the six maps on the 52 general election contests in the last decade; each colored dot is plotted as the coordinate pair (vote share, seat share).

2.5 Up-ballot races

The same patterns are apparent if we narrow our focus to the smaller set of better-known "up-ballot" races: in order, the first five to appear on the ballot are the contests for President, U.S. Senator, Governor, Lieutenant Governor, and Attorney General. Together these occurred 14 times in the last Census cycle.

	Up-ballot generals (14)		**All generals (52)**	
	D vote share	D seat share	D vote share	D seat share
SL-174	.4883	.2908	.4911	.3118
NCLCV-Cong		.4796		.4931
SL-173	.4883	.3957	.4911	.4065
NCLCV-Sen		.4557		.4592
SL-175	.4883	.3994	.4911	.4080
NCLCV-House		.4649		.4684

Table 2: Comparing overall fidelity of representation to the voting preferences of the electorate. Vote shares are computed with respect to the major-party vote total.

Figure 3 shows the performance of the Congressional maps in the three Presidential contests in the last Census cycle, where the Democratic vote share (pink box) was between 48% and 50% of the major-party total each time. For a contest that is so evenly divided, we would expect a fair map to have 6, 7, or 8 out of 14 districts favoring each party. The alternative Congressional map NCLCV-Cong does just that, while the enacted plan SL-174 has just 4 out of 14 Democratic-majority districts each time (green and maroon circles). The alternative plan is far more successful at reflecting the even split of voter preferences.

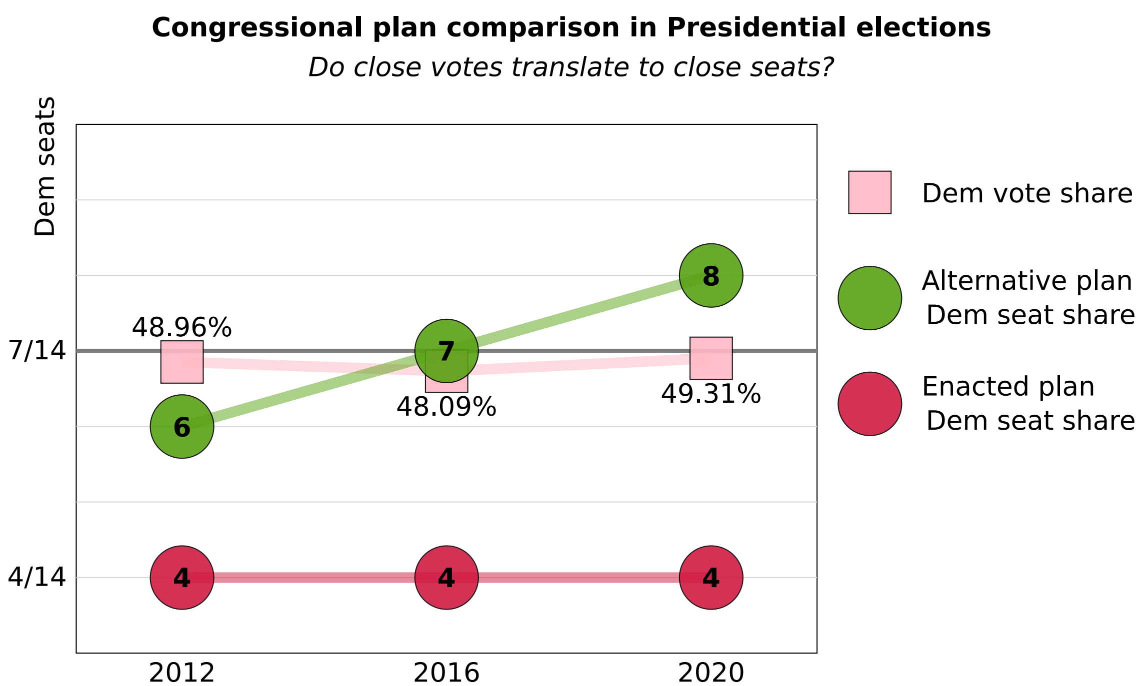


Figure 3: When Presidential voting is overlaid on the plans, we can compare the Democratic seat share in the enacted Congressional plan SL-174 (**maroon**) and the alternative Congressional plan NCLCV-Cong (**green**) to the vote share (**pink**) for Democratic candidates. The 50% line is marked.

Next, simplified versions of the same type of graphic are presented for all five up-ballot offices. Figure 4 compares Congressional maps, and Figure 5 compares legislative maps in the same fashion.

In these figures, we can view whether the plans display a tendency to uphold the Close-Votes-Close-Seats norm, for one office at a time. The pink squares are the vote share. If they are close to the 50-50 mark, then a fair map would also produce seat shares that are close to that mark. This is consistently true for the alternative plans and consistently false for the enacted plans.

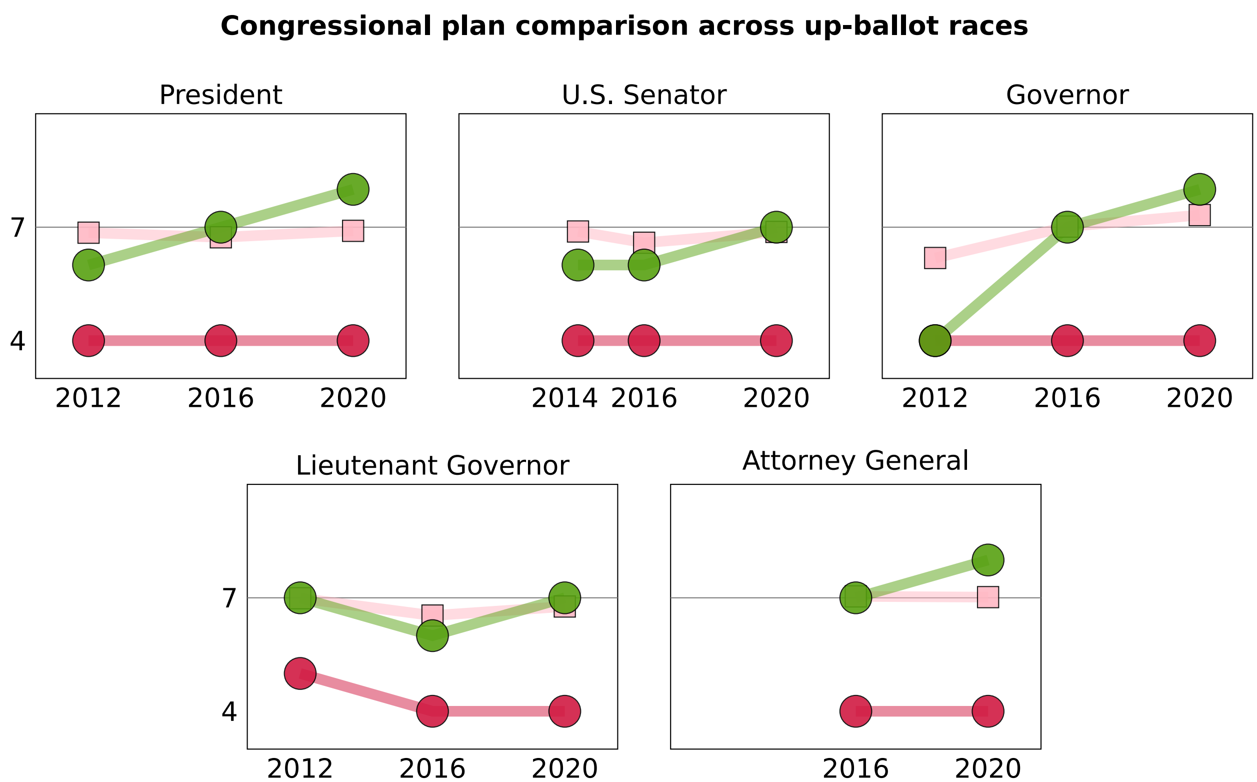


Figure 4: For up-ballot general election contests across the previous Census cycle, we can compare the seat share under the enacted Congressional plan SL-174 (**maroon**) and the seat share under the alternative Congressional plan NCLCV-Cong (**green**) to the vote share (**pink**) for Democratic candidates. The presidential comparison from the previous figure is repeated here, alongside the other four up-ballot offices. The 50% line is marked each time.

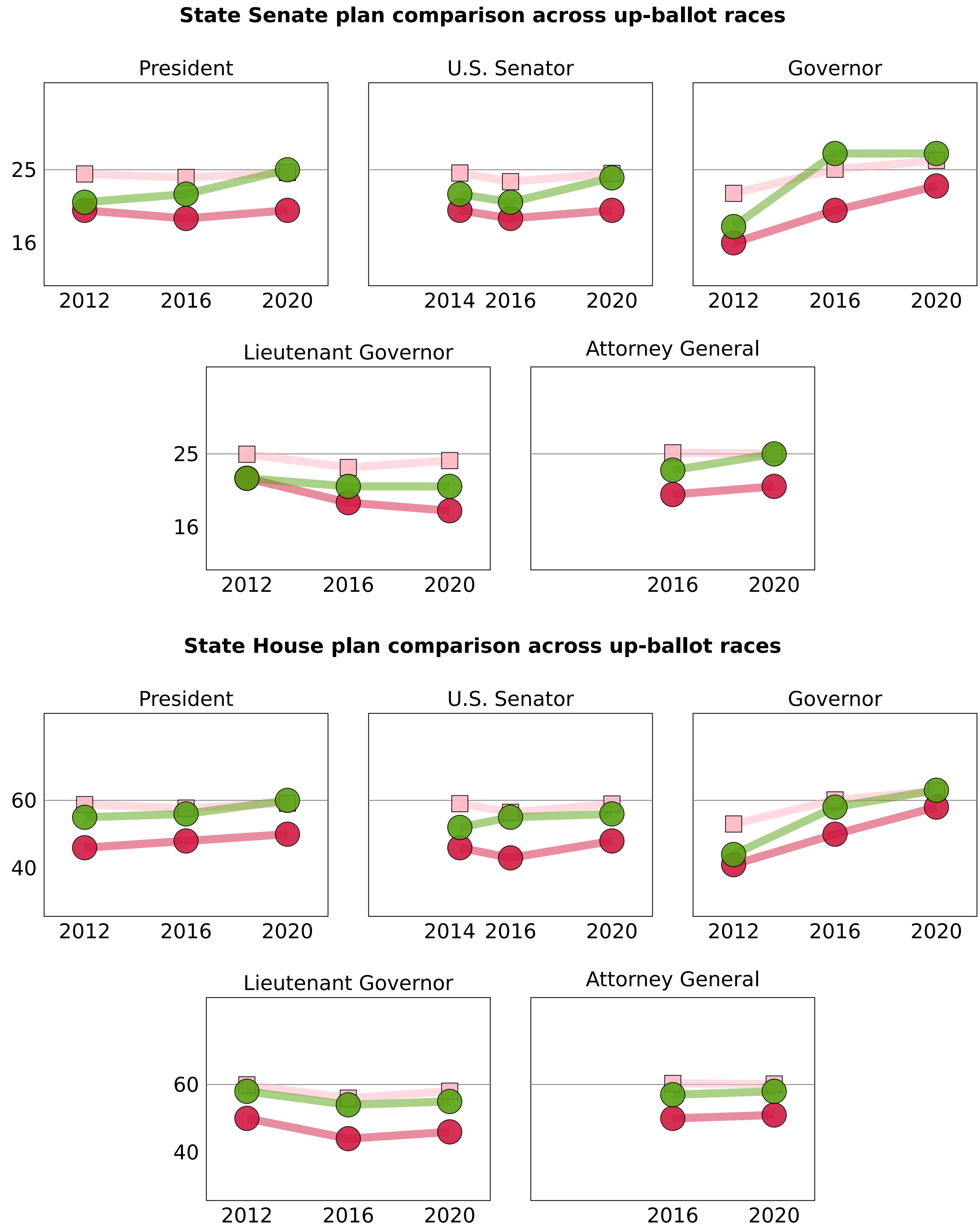


Figure 5: Legislative plans overlaid with voting patterns from up-ballot elections. The enacted plans SL-173 and SL-175 are shown in **maroon**. The alternative plans NCLCV-Sen and NCLCV-House, in **green**, have seat shares tracking much closer to the nearly even voting preferences.

3 Racial vote dilution

North Carolina has a large minority of Black-identified residents. Over two million North Carolinians—2,107,526 out of 10,439,388 to be precise, or about 20.2%—were identified as non-Hispanic Black-alone on the Census. Within the voting-age population, the numbers shift to 1,620,569 out of 8,155,099, or about 19.9%. Increasing numbers of Americans identify as Black in combination with other races and/or Hispanic ethnicity. Passing to this more expansive definition of Black voting age population raises the numbers to 1,743,052 out of 8,155,099, or 21.4%.

Minority groups' opportunity to elect candidates of choice is protected by both state and federal law. A detailed assessment of opportunity must not primarily hinge on the demographics of the districts, but must also rely on electoral history and an assessment of polarization patterns.[3]

I have used industry-leading techniques to study the racial polarization patterns in North Carolina general and primary elections from the last decade. They indicate a consistent pattern of polarization in statewide general elections, such that White voters are estimated to support the Republican candidate at a rate of over 61% in every general election, and Black voters are estimated to support the Democratic candidate at a rate of over 94% each time. Polarization is present in many Democratic primary elections as well, particularly in elections in which there is a Black Democratic candidate. I have designated a selection of eight elections—four generals and four primaries—chosen to be particularly informative in determining whether Black voters have an opportunity to elect their candidates of choice.

Democratic Primaries

- Sutton preferred over Mangrum in the 2020 Superintendent primary;
- Smith preferred over Wadsworth in the 2020 Ag. Commissioner primary;
- Williams preferred over Stein in the 2016 Attorney General primary;
- Coleman preferred over the field in the 2016 Lieutenant Governor primary.

General Elections

- Holley preferred over Robinson in the 2020 Lieutenant Governor election;
- Cunningham preferred over Tillis in the 2020 U.S. Senate election;
- Coleman preferred over Forest in the 2016 Lieutenant Governor election;
- Blue preferred over Folwell in the 2016 Treasurer election.

These eight contests were chosen by a combination of factors that combine to make an election particularly informative with respect to the preferences of Black voters. Namely: I prioritized elections that are more recent, that have a Black candidate on the ballot, that are clearly polarized, and that are close enough to produce variation at the district level.[4]

The electoral alignment score derived from these elections is a value from 0 to 8. I consider a district in which the Black candidate of choice prevails in at least 6 of these 8 contests to be aligned with Black voting preferences in the state.[5] If, in addition, at least 25% of the voting age population is Black, then I label the district to be effective for Black voters.

I note that the use of electoral history is not just cosmetic: there are House-sized districts with 35-39% BVAP that are nonetheless not labeled effective in these lists because they fall short of the standard of inclining to the Black candidate of choice in at least six out of the eight chosen elections.

[3] A detailed discussion of the inadequacy of using demographics alone as a proxy can be found in [3].

[4] Of the candidates above, Sutton, Williams, Coleman, Colley, and Blue are themselves Black-identified.

[5] I have used statewide ecological inference ("EI") runs to determine the candidate of choice for Black voters. I note that it is also possible to run EI on smaller geographies (such as counties or county clusters) to detect regional candidates of choice rather than statewide candidates of choice; in most cases, these will be the same, but in some cases, regional effects may be meaningful and could affect these results at the margin.

At all three levels, the NCLCV alternative maps provide more effective opportunity-to-elect districts for Black voters than the corresponding enacted plans.

Effective districts for Black voters
Out of 14 Congressional districts, SL-174 has 2 effective districts, while NCLCV-Cong has 4.
Out of 50 Senate districts, SL-173 has 8 effective districts, while NCLCV-Sen has 12.
Out of 120 House districts, SL-175 has 24 effective districts, while NCLCV-House has 36.

effective districts in state plan	effective districts in alternative plan
CD2, 9	CD2, 4, 9, 11
SD5, 11, 14, 19, 28, 38, 39, 40	SD1, 5, 11, 14, 18, 19, 26, 27, 32, 38, 39, 40
HD8, 23, 24, 25, 27, 32, 38, 39, 42, 44, 48, 57, 58, 60, 66, 71, 92, 99, 100, 101, 102, 106, 107, 112	HD2, 8, 9, 10, 23, 24, 25, 27, 31, 32, 33, 38, 39, 40, 42, 43, 44, 45, 48, 57, 58, 59, 60, 61, 63, 66, 71, 88, 92, 99, 100, 101, 102, 106, 107, 112

4 Detailed plan comparison

Detailed maps showing how the district lines cut through the patterns of Democratic and Republican support, and how they cut through the demographic location of Black voting age population, can be found in Appendix B.

4.1 Traditional districting principles

Principles that are relevant to North Carolina redistricting include the following.

- **Population balance.** The standard interpretation of *One Person, One Vote* for Congressional districts is that districts should be fine-tuned so that their total Census population deviates by no more than one person from any district to any other.

  There is more latitude with legislative districts; they typically vary top-to-bottom by no more than 10% of ideal district size. In North Carolina, the Whole County Provisions make it very explicit that 5% deviation must be tolerated if it means preserving more counties intact.

  All six plans have acceptable population balance.

Population deviation

	Max Positive Deviation	District	Max Negative Deviation	District
SL-174	0	(eight districts)	−1	(six districts)
NCLCV-Cong	0	(eight districts)	−1	(six districts)
SL-173	10,355 (4.960%)	5	−10,434 (4.997%)	13,18
NCLCV-Sen	10,355 (4.960%)	5	−10,427 (4.994%)	15
SL-175	4250 (4.885%)	18	−4189 (4.815%)	112
NCLCV-House	4341 (4.990%)	82	−4323 (4.969%)	87

Table 3: Deviations are calculated with respect to the rounded ideal district populations of 745,671 for Congress, 208,788 for Senate, and 86,995 for House.

- **Contiguity.** All six plans are contiguous; for each district, it is possible to transit from any part of the district to any other part through a sequence of census blocks that share boundary segments of positive length. As is traditional in North Carolina, contiguity through water is accepted.

- **Compactness.** The two compactness metrics most commonly appearing in litigation are the *Polsby-Popper score* and the *Reock score*. Polsby-Popper is the name given in redistricting to a metric from ancient mathematics: the isoperimetric ratio comparing a region's area to its perimeter via the formula $4\pi A/P^2$. Higher scores are considered more compact, with circles uniquely achieving the optimum score of 1. Reock is a different measurement of how much a shape differs from a circle: it is computed as the ratio of a region's area to that of its circumcircle, defined as the smallest circle in which the region can be circumscribed. From this definition, it is clear that it too is optimized at a value of 1, which is achieved only by circles.

  These scores depend on the contours of a district and have been criticized as being too dependent on map projections or on cartographic resolution [1, 2]. Recently, some mathematicians have argued for using discrete compactness scores, taking into account the units of Census geography from which the district is built. The most commonly cited discrete score for districts is the *cut edges score*, which counts how many adjacent pairs of geographical units receive different district assignments. In other words, cut edges measures the "scissors complexity" of the districting plan: how much work would have to be done to separate the districts from each other? Plans with a very intricate boundary would require many separations. This score improves on the contour-based scores by better controlling for factors like coastline and other natural boundaries, and by focusing on the units actually available to redistricters rather than treating districts like free-form Rorschach blots.

  The alternative plans are significantly more compact than the enacted plans in all three compactness metrics.

Compactness

	block cut edges (lower is better)	average Polsby-Popper (higher is better)	average Reock (higher is better)
SL-174	5194	0.303	0.417
NCLCV-Cong	4124	0.383	0.470
SL-173	9702	0.342	0.416
NCLCV-Sen	9249	0.369	0.428
SL-175	16,182	0.351	0.437
NCLCV-House	13,963	0.414	0.465

Table 4: Comparing compactness scores via one discrete and two contour-based metrics. These scores were computed using dissolved districts based on the census blocks that were assigned in the plans under discussion.

District-by-district compactness scores for the contour-based metrics are shown in Tables 5-7.

	Reock		Polsby-Popper	
CD	SL-174	NCLCV-Cong	SL-174	NCLCV-Cong
1	0.517	0.534	0.324	0.403
2	0.303	0.47	0.278	0.323
3	0.484	0.212	0.331	0.228
4	0.487	0.412	0.39	0.304
5	0.468	0.582	0.347	0.514
6	0.418	0.472	0.231	0.483
7	0.424	0.664	0.199	0.434
8	0.472	0.523	0.532	0.398
9	0.678	0.579	0.469	0.43
10	0.41	0.285	0.197	0.254
11	0.282	0.553	0.207	0.532
12	0.247	0.388	0.243	0.368
13	0.41	0.558	0.266	0.379
14	0.232	0.354	0.221	0.313

Table 5: Compactness scores by district for the Congressional plans.

	Reock		Polsby-Popper	
SD	SL-173	NCLCV-Sen	SL-173	NCLCV-Sen
1	0.263	0.297	0.213	0.174
2	0.231	0.397	0.105	0.178
3	0.409	0.409	0.179	0.179
4	0.564	0.564	0.406	0.406
5	0.403	0.403	0.335	0.335
6	0.616	0.616	0.595	0.595
7	0.213	0.553	0.219	0.411
8	0.446	0.457	0.439	0.478
9	0.443	0.441	0.217	0.226
10	0.618	0.618	0.614	0.614
11	0.464	0.464	0.376	0.376
12	0.42	0.388	0.395	0.404
13	0.284	0.357	0.257	0.4
14	0.399	0.523	0.247	0.45
15	0.397	0.52	0.231	0.398
16	0.619	0.51	0.473	0.388
17	0.488	0.54	0.361	0.505
18	0.376	0.644	0.309	0.514
19	0.53	0.53	0.34	0.34
20	0.384	0.387	0.363	0.344
21	0.218	0.218	0.137	0.137
22	0.473	0.459	0.471	0.517
23	0.498	0.498	0.529	0.529
24	0.52	0.52	0.452	0.452
25	0.283	0.325	0.271	0.276
26	0.451	0.397	0.301	0.331
27	0.541	0.364	0.437	0.321
28	0.444	0.544	0.248	0.457
29	0.317	0.378	0.202	0.252
30	0.4	0.4	0.456	0.456
31	0.482	0.429	0.344	0.355
32	0.62	0.455	0.422	0.354
33	0.322	0.322	0.294	0.294
34	0.49	0.477	0.523	0.489
35	0.375	0.342	0.225	0.348
36	0.463	0.314	0.411	0.294
37	0.401	0.397	0.421	0.437
38	0.523	0.566	0.334	0.444
39	0.356	0.391	0.295	0.368
40	0.381	0.453	0.382	0.538
41	0.287	0.519	0.294	0.531
42	0.429	0.397	0.273	0.469
43	0.533	0.341	0.522	0.274
44	0.386	0.425	0.46	0.357
45	0.343	0.391	0.25	0.3
46	0.229	0.249	0.184	0.213
47	0.186	0.116	0.127	0.113
48	0.404	0.373	0.38	0.264
49	0.479	0.424	0.358	0.22
50	0.422	0.312	0.441	0.335

Table 6: Compactness scores by district for the Senate plans.

	Reock		Polsby-Popper	
HD	SL-175	NCLCV-House	SL-175	NCLCV-House
1	0.413	0.393	0.213	0.168
2	0.316	0.404	0.326	0.468
3	0.377	0.448	0.298	0.329
4	0.482	0.337	0.448	0.237
5	0.28	0.28	0.3	0.3
6	0.389	0.539	0.479	0.549
7	0.476	0.442	0.44	0.403
8	0.394	0.437	0.327	0.314
9	0.587	0.698	0.411	0.425
10	0.589	0.606	0.567	0.398
11	0.359	0.654	0.246	0.473
12	0.312	0.312	0.291	0.291
13	0.379	0.367	0.425	0.488
14	0.384	0.305	0.291	0.204
15	0.546	0.468	0.371	0.395
16	0.404	0.483	0.242	0.388
17	0.416	0.668	0.227	0.473
18	0.589	0.336	0.37	0.374
19	0.462	0.482	0.285	0.359
20	0.463	0.172	0.557	0.173
21	0.45	0.591	0.206	0.469
22	0.528	0.528	0.361	0.361
23	0.453	0.453	0.359	0.359
24	0.463	0.554	0.538	0.638
25	0.463	0.402	0.511	0.455
26	0.45	0.474	0.4	0.412
27	0.433	0.433	0.353	0.353
28	0.573	0.411	0.498	0.43
29	0.36	0.519	0.333	0.645
30	0.381	0.306	0.356	0.389
31	0.415	0.476	0.323	0.533
32	0.534	0.528	0.587	0.543
33	0.491	0.254	0.289	0.252
34	0.414	0.383	0.289	0.349
35	0.28	0.528	0.292	0.464
36	0.586	0.396	0.532	0.443
37	0.417	0.372	0.369	0.379
38	0.377	0.522	0.247	0.383
39	0.649	0.399	0.519	0.245
40	0.413	0.342	0.336	0.242
41	0.521	0.581	0.423	0.498
42	0.537	0.402	0.395	0.258
43	0.52	0.415	0.281	0.372
44	0.587	0.564	0.419	0.564
45	0.248	0.555	0.274	0.495
46	0.316	0.432	0.239	0.275
47	0.604	0.535	0.498	0.453
48	0.479	0.479	0.442	0.442
49	0.447	0.555	0.358	0.604
50	0.375	0.384	0.343	0.388
51	0.48	0.427	0.283	0.262
52	0.352	0.468	0.214	0.28
53	0.322	0.597	0.256	0.449
54	0.459	0.486	0.376	0.442
55	0.458	0.534	0.312	0.399
56	0.502	0.652	0.37	0.691
57	0.436	0.589	0.368	0.475
58	0.397	0.521	0.257	0.432
59	0.455	0.463	0.334	0.56
60	0.383	0.361	0.261	0.407

	Reock		Polsby-Popper	
HD	SL-175	NCLCV-House	SL-175	NCLCV-House
61	0.388	0.356	0.294	0.346
62	0.318	0.651	0.312	0.589
63	0.56	0.596	0.353	0.533
64	0.329	0.48	0.257	0.459
65	0.594	0.594	0.764	0.764
66	0.457	0.46	0.264	0.293
67	0.444	0.444	0.486	0.486
68	0.45	0.577	0.305	0.502
69	0.539	0.49	0.346	0.364
70	0.542	0.638	0.535	0.65
71	0.267	0.488	0.275	0.509
72	0.521	0.495	0.27	0.398
73	0.487	0.46	0.421	0.612
74	0.367	0.548	0.299	0.425
75	0.388	0.468	0.266	0.53
76	0.43	0.43	0.497	0.497
77	0.408	0.408	0.297	0.297
78	0.341	0.479	0.204	0.447
79	0.523	0.353	0.36	0.2
80	0.285	0.413	0.319	0.359
81	0.481	0.434	0.312	0.359
82	0.311	0.444	0.32	0.477
83	0.474	0.473	0.328	0.342
84	0.498	0.57	0.515	0.645
85	0.501	0.493	0.315	0.299
86	0.49	0.49	0.437	0.437
87	0.538	0.512	0.437	0.526
88	0.233	0.367	0.211	0.364
89	0.304	0.462	0.291	0.338
90	0.508	0.431	0.349	0.381
91	0.541	0.563	0.522	0.583
92	0.28	0.399	0.244	0.455
93	0.317	0.33	0.288	0.319
94	0.507	0.496	0.348	0.371
95	0.616	0.49	0.596	0.516
96	0.358	0.316	0.351	0.33
97	0.321	0.321	0.515	0.515
98	0.593	0.574	0.576	0.589
99	0.469	0.471	0.322	0.443
100	0.537	0.359	0.333	0.312
101	0.488	0.518	0.31	0.515
102	0.392	0.621	0.23	0.36
103	0.278	0.546	0.349	0.479
104	0.573	0.432	0.32	0.313
105	0.395	0.437	0.419	0.391
106	0.599	0.485	0.419	0.503
107	0.304	0.529	0.183	0.556
108	0.374	0.402	0.24	0.288
109	0.466	0.485	0.421	0.522
110	0.355	0.514	0.277	0.39
111	0.348	0.641	0.24	0.436
112	0.58	0.266	0.397	0.229
113	0.392	0.368	0.224	0.186
114	0.307	0.549	0.182	0.46
115	0.559	0.308	0.349	0.289
116	0.401	0.532	0.159	0.332
117	0.422	0.581	0.271	0.393
118	0.412	0.412	0.247	0.247
119	0.276	0.276	0.22	0.22
120	0.4	0.4	0.367	0.367

Table 7: Compactness scores by district for the House plans.

- **Respect for political subdivisions.** For legislative redistricting, North Carolina has one of the strongest requirements for county consideration of any state in the nation. In my understanding, courts have interpreted the Whole County Provisions as follows.[6]
  - First, if any county is divisible into a whole number of districts that will be within ±5% of ideal population, then it must be subdivided accordingly without districts crossing into other counties.
  - Next, seek any contiguous grouping of two counties that is similarly divisible into a whole number of districts.
  - Repeat for groupings of three, and so on, until all counties are accounted for.

  Once clusters have been formed, there are more rules about respecting county lines within clusters. The legal language is again explicit: "[T]he resulting interior county lines created by any such groupings may be crossed or traversed in the creation of districts within said multi-county grouping but only to the extent necessary" to meet the ±5% population standard for districts. To address this, I have counted the *county traversals* in each plan, i.e., the number of times a district crosses between adjacent counties within a grouping.

  Table 8 reflects the county integrity metric that is most relevant at each level: the enacted congressional plan splits 11 counties into 25 pieces while the alternative plan splits 13, but splits no county three ways. (The enacted plans unnecessarily split three counties into three pieces.) In the legislative plans, the law specifies traversals as the fundamental integrity statistic.

County and municipality preservation

	# county pieces
SL-174	25
NCLCV-Cong	26

	# traversals
SL-173	97
NCLCV-Sen	89
SL-175	69
NCLCV-House	66

	# municipal pieces (considering all blocks)	# municipal pieces (considering populated blocks)
SL-174	90	50
NCLCV-Cong	58	41
SL-173	152	91
NCLCV-Sen	125	100
SL-175	292	222
NCLCV-House	201	173

Table 8: Comparing the plans' conformance to political boundaries.

[6] A complete set of solutions is described in detail in the white paper of Mattingly et al.—though with the important caveat that the work "does not reflect... compliance with the Voting Rights Act" [4]. Absent a VRA conflict, the 2020 Decennial Census population data dictates that the North Carolina Senate plan must be decomposed into ten single-district fixed clusters and seven multi-district fixed clusters (comprising 2, 2, 3, 3, 4, 6, and 6 districts, respectively). It has four more areas in which there is a choice of groupings. In all, there are sixteen different possible clusterings for Senate, each comprising 26 county clusters. The House likewise has 11 single-district fixed clusters and 22 multi-district fixed clusters (with two to thirteen districts per cluster), together with three more areas with a choice of groupings. In all, the House has only eight acceptable clusterings, each comprising 40 county clusters. Again, it is important to note that VRA compliance may present a compelling reason to select some clusterings and reject others.

The alternative plans are comparable to the enacted plans, and often superior, in each of these key metrics regarding preservation of political boundaries. This remains true whether splits of municipalities are counted by the division of any of their census blocks, or only by the division of populated census blocks.

I will briefly mention several additional redistricting principles.

- **Communities of interest.** In North Carolina, there was no sustained effort by the state or by community groups to formally collect community of interest (COI) maps, to my knowledge. Without this, it is difficult to produce a suitable metric.
- **Cores of prior districts.** In some states, there is statutory guidance to seek districting plans that preserve the cores of prior districts. In North Carolina, this is not a factor in the constitution, in statute, or in case law. In addition, attention to core preservation would be prohibitively difficult in the Senate and House because of the primacy of the Whole County Provisions, which forces major changes to the districts simply as a consequence of fresh population numbers.
- **Incumbent pairing.** In 2017, the North Carolina legislative redistricting committee listed "incumbency protection" as a goal in their itemization of principles. In 2021, this was softened to the statement that "Member residence may be considered" in the drawing of districts. I have counted the districts in each plan that contain more than one incumbent address; these are sometimes colorfully called "double-bunked" districts. For this statistic, it is not entirely clear whether a high or low number is preferable. When a plan remediates a gerrymandered predecessor, we should not be surprised if it ends up pairing numerous incumbents.

Double-bunking

	# districts pairing incumbents
SL-174	3
NCLCV-Cong	1
SL-173	5
NCLCV-Sen	9
SL-175	6
NCLCV-House	16

Table 9: For Congress and Senate, the enacted and alternative plans are comparable; at the House level, the alternative plan has more double-bunking. *Note: These numbers were calculated using incumbent addresses that I understand were provided by the Legislative Defendants.*

4.2 Swing districts and competitive contests

Another way to understand the electoral properties of districting plans is to investigate how many districts always give the same partisan result over a suite of observed electoral conditions, and how many districts can "swing" between the parties. Figure 6 compares the six plans across the up-ballot elections. The enacted plans lock in large numbers of always-Republican seats. In the Senate and House, nearly half the seats are locked down for Republicans. In the Congressional plan, it's well *over* half. This provides another view from which the NCLCV plans provide attractive alternatives.

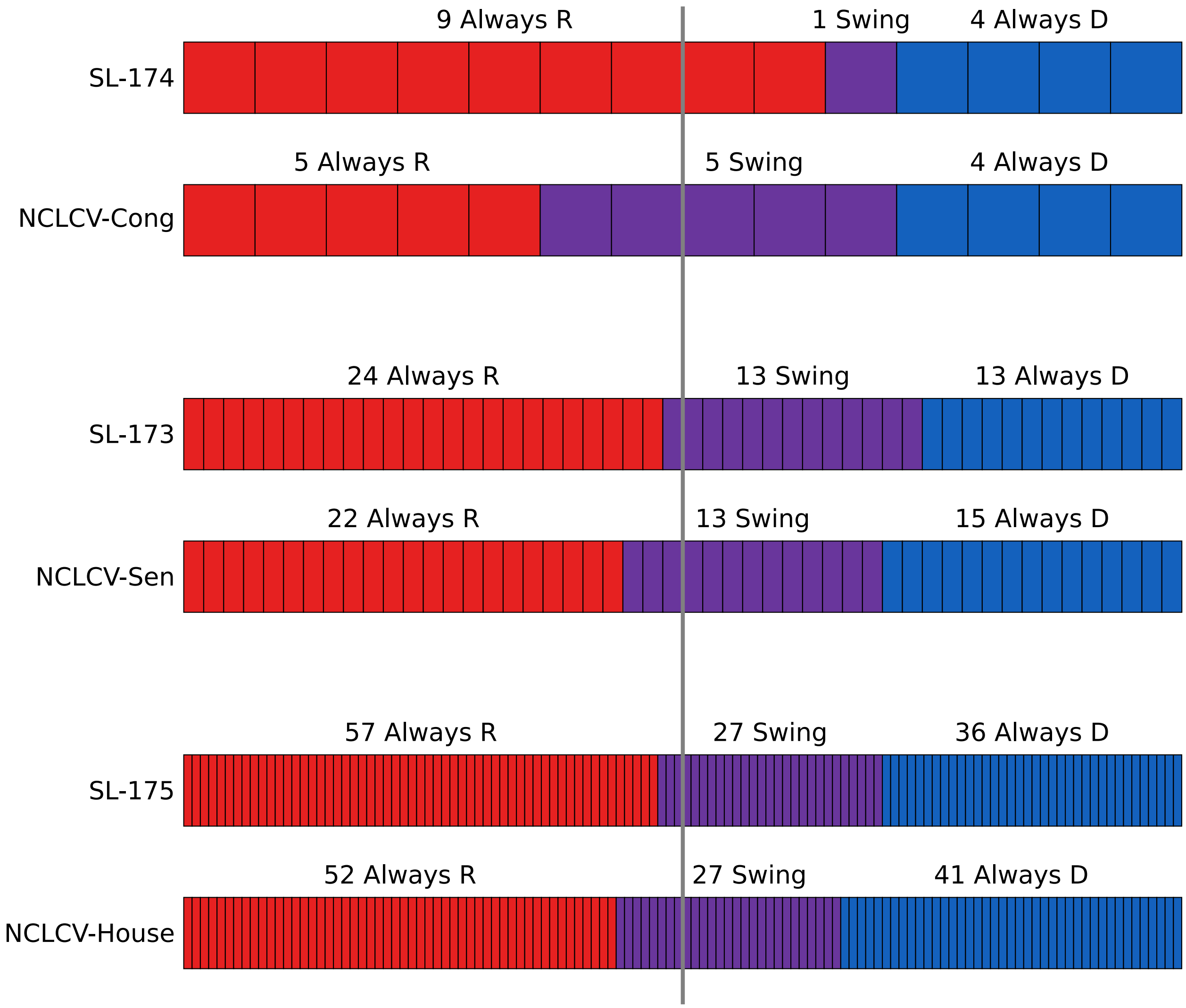


Figure 6: These visuals show the breakdown of seats that always have a Republican winner, always have a Democratic winner, or are sometimes led by each party across the 14 up-ballot elections over the previous Census cycle. The 50-50 split is marked.

In interpreting this visualization, note that this is consistent with the discussion elsewhere of entrenched Republican majorities in the enacted maps. These Always-Republican districts provide a *floor* for Republican performance from the viewpoint of these up-ballot contests.

One more measure of partisan fairness, frequently referenced in the public discourse, is the tendency of a districting plan to promote close or competitive contests. We close with a comparison of the enacted and alternative plans that displays the number of times across the full dataset of 52 elections that a contest had a partisan margin of closer than 10 points, 6 points, or 2 points, respectively. This can occur up to $14 \cdot 52 = 728$ times in Congressional maps, $50 \cdot 52 = 2600$ times in state Senate maps, and $120 \cdot 52 = 6240$ times in state House maps. The figures below show horizontal rules at every 10% interval of the total number of possible competitive contests; we can see, for instance, that the alternative Congressional plan has contests within a 10-point margin more than 40% of the time.

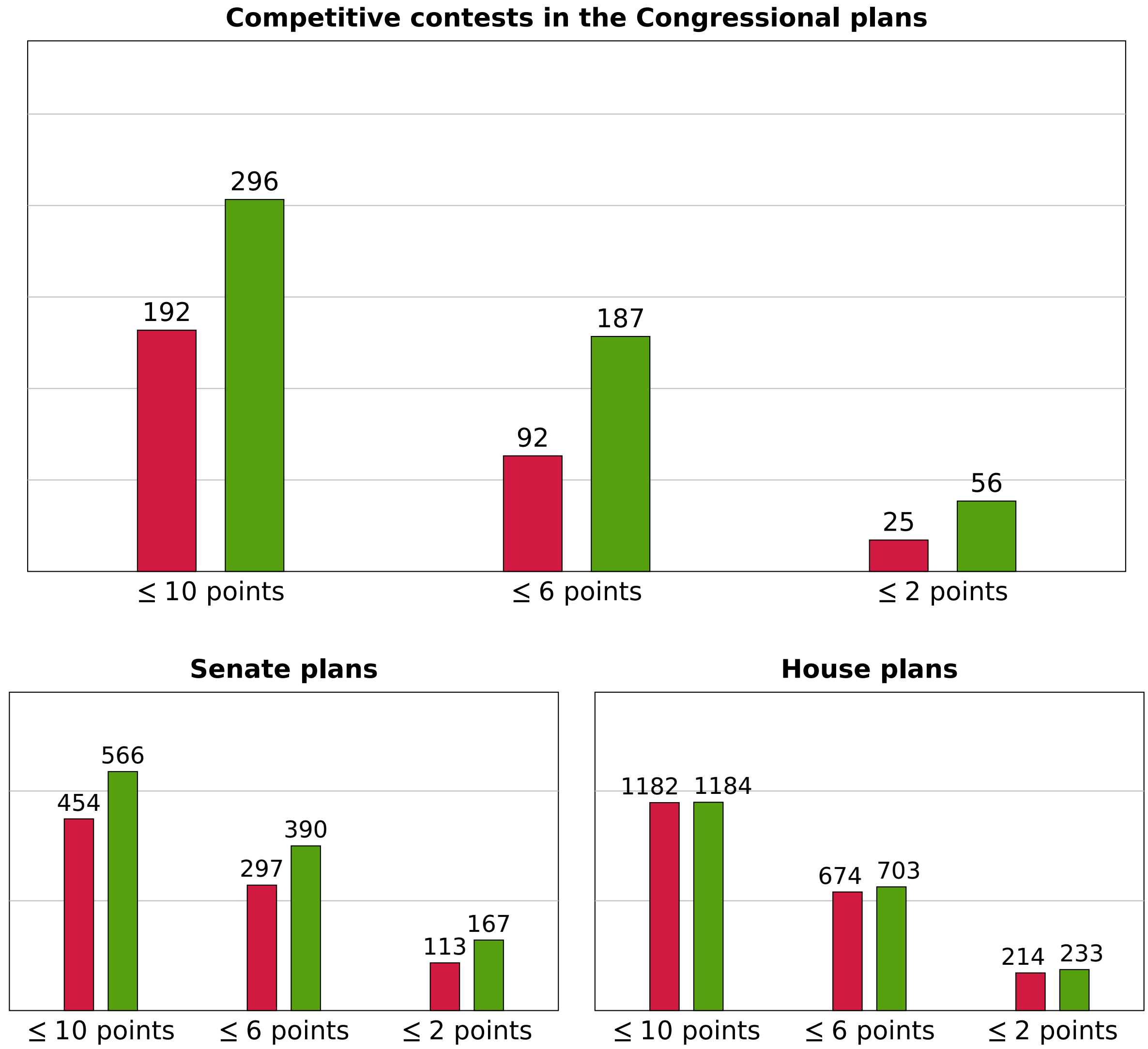


Figure 7: These bar graphs show the number of competitive contests for the enacted plans (**maroon**) and the alternative plans (**green**). In each plot, we consider increasingly restrictive definitions of "competitive" from left to right, counting districts in which the major-party vote split is closer than 45-55, 47-53, and 49-51, respectively.

5 Location-specific comparison of electoral opportunity

I received information reflecting the residential locations of 147 individuals, who come from either of two groups:

- plaintiffs in the NCLCV v. Hall case; or
- registered voters belonging to the NCLCV membership who are Black and/or are registered as Democrats.

In Table 10 below, I summarize the impact on the identified individuals in terms of electoral opportunity if the enacted maps are compared to the alternative maps.

Subsequently, Figures 8 and 9 provide a visualization that pinpoints the geographical sites where the alternative plans improve electoral opportunities for plaintiffs and NCLCV members—that is, places where the identified individuals (as Democrats and/or Black voters) have measurably greater ability to elect their candidates of choice under the alternative plans than under the existing plans.

This is backed up by the data in Tables 11-13 below, which identify the district numbers in the six enacted and alternative plans for each of these identified individuals. The district numbers were computed using census block information to specify the locations, but the table reports the locations by larger units (VTDs) in order to protect privacy.

Lost opportunity for Democratic and Black voters

	greater Democratic opportunity in alternative plan than enacted plan
Congress	51 individuals
Senate	37 individuals
House	39 individuals

	resides in effective district in alternative plan but not enacted plan
Congress	28 Black voters
Senate	21 Black voters
House	21 Black voters

Table 10: Of the 147 identified individuals, how many saw a change in their opportunity for Democratic representation? How many Black voters saw a change in their opportunity to elect Black candidates of choice?

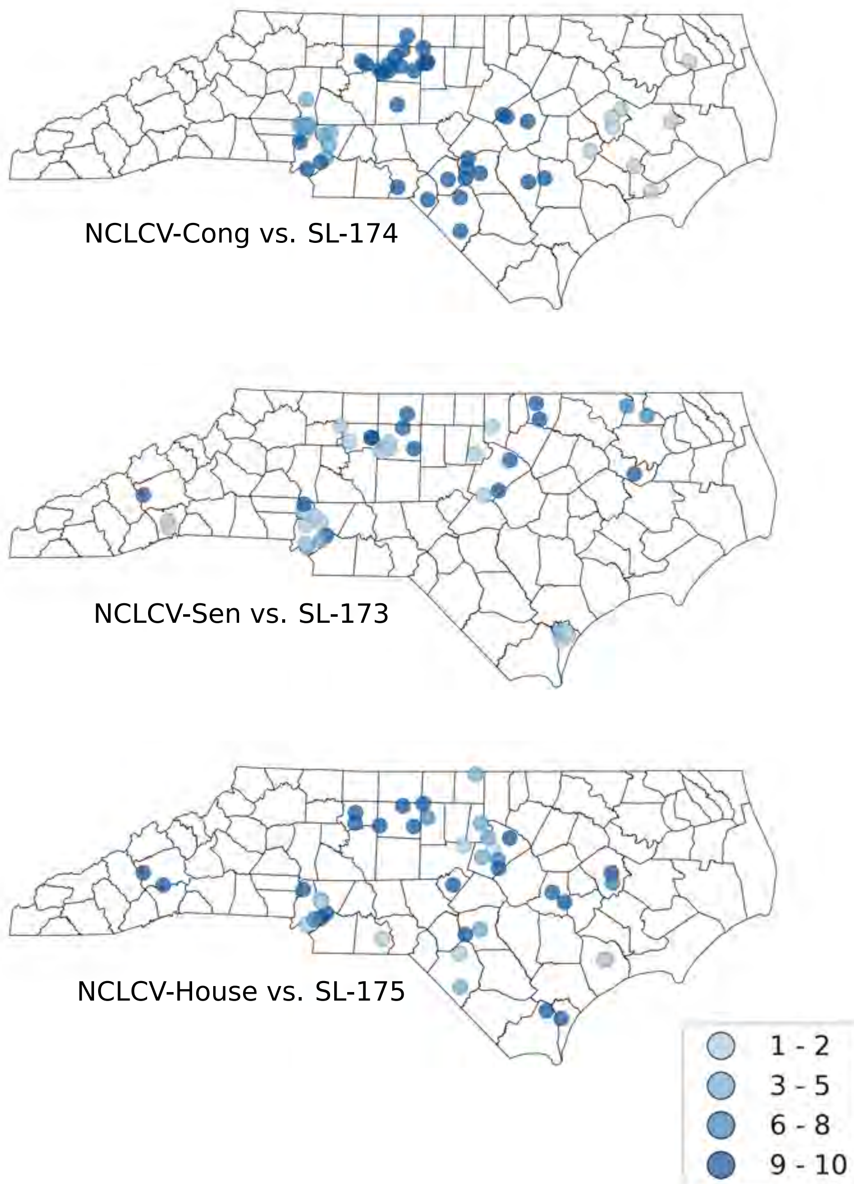


Figure 8: Locations where identified individuals have less opportunity to be represented by a Democrat in Congress, state Senate, and state House under the enacted plans. The shading indicates the drop in Democratic wins across the 14 up-ballot races in the enacted map relative to the alternative map. There are 51 such individuals in the Congressional maps, 37 in the Senate maps, and 31 in the House maps.

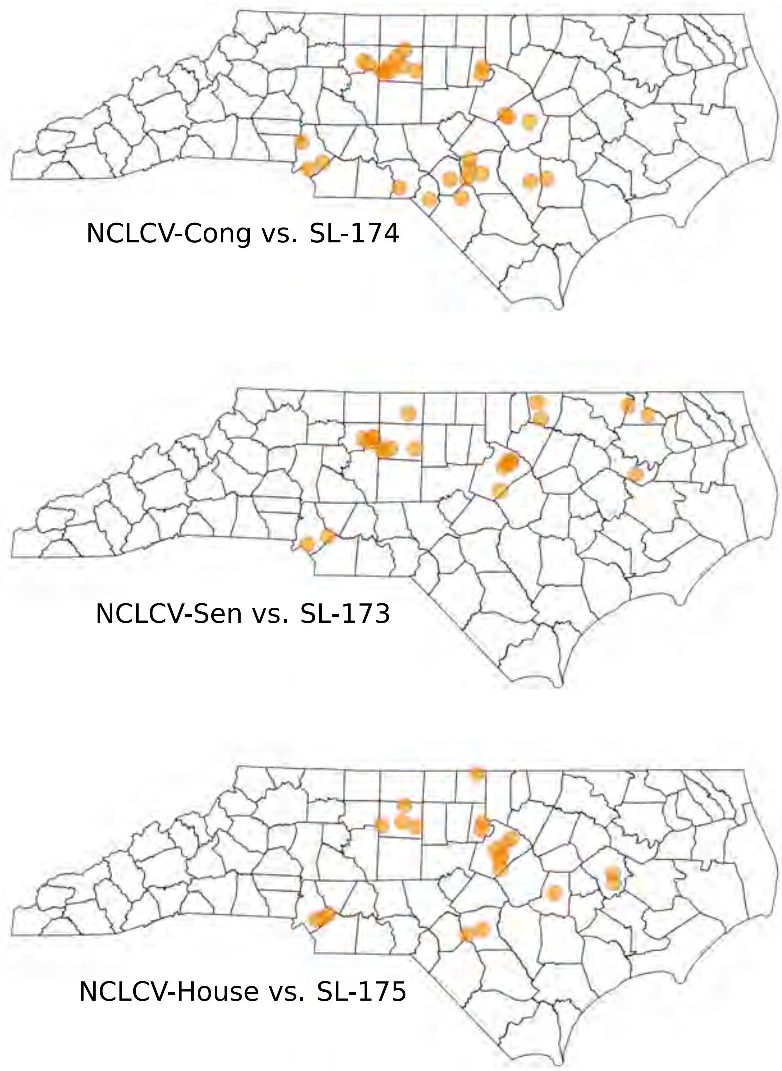


Figure 9: Locations where Black voters from the identified individuals list would be in a district that provides effective electoral opportunity under the alternative plan, but not under the enacted plan. There are 28 such voters at the Congressional level and 21 at each of the Senate and House level.

VTD Census ID	VTD/Precinct Name	SL-174	NCLCV-Cong	SL-173	NCLCV-Sen	SL-175	NCLCV-House
37025001-07	01-07	10	10	34	34	73	73
37025012-03	12-03	10	10	34	34	82	82
37025002-07	02-07	10	10	34	34	83	73
37009000002	CLIFTON	11	12	47	47	93	93
37063000029	GLENN ELEMENTARY	6	2	22	22	2	2
37063000043	FOREST VIEW ELEMENTARY	6	6	22	20	30	30
37063000052	EVANGEL ASSEMBLY OF GOD	6	2	22	22	31	31
37063055-11	055-11	6	6	20	22	29	29
37071000012	FLINT GROVES	13	13	43	43	108	108
37071000004	FOREST HEIGHTS	13	13	43	43	109	109
37057000076	THOMASVILLE 10 76	7	8	30	30	80	80
371350000EF	EFLAND	6	6	23	23	50	50
371050000A2	A2	7	7	12	12	51	54
37131NEWTOW	NEWTOWN	2	2	1	1	27	27
371350000CF	CEDAR FALLS	6	6	23	23	56	56
37081000H25	H25	10	11	27	27	62	60
37093000061	RAEFORD 1	8	4	24	24	48	48
37081000RC2	RC2	7	11	26	26	59	59
3712700P15A	OAK LEVEL	2	2	11	11	25	25
3707700TYHO	00TYHO	2	2	13	13	32	32
370910000CO	COFIELD	2	1	1	1	5	5
37057000038	EASTSIDE 38	7	8	30	30	81	81
370210021.1	HAW CREEK ELEMENTARY SCHOOL	14	14	49	49	115	114
37019000015	GRISSETTOWN	3	3	8	8	17	19
37047000P15	TATUM	3	3	8	8	46	46
37019000002	LELAND	3	3	8	8	17	17
370450CASAR	CASAR	13	13	44	44	110	111
370210007.1	KENILWORTH PRESBYTERIAN CHURCH	14	14	49	49	114	115
370210053.1	LEICESTER 2 - COMMUNITY CENTER	14	14	46	49	116	116
370210054.2	LUTHERAN CHURCH OF THE NATIVITY	14	14	49	49	116	115
37193000108	FAIRPLAINS	11	12	36	36	94	94
37173000BC2	BC2	14	14	50	47	119	119
37119000054	54	9	9	40	42	102	112
37119000108	108	9	9	40	40	100	100
37119000208	208	13	10	37	38	98	98
371190204.1	204.1	9	10	40	40	99	106
37119000097	97	9	9	42	39	112	105
37119000222	222	9	9	38	39	101	101
37097000ST6	STATESVILLE 6	12	10	37	37	84	84
370970DV1-B	DAVIDSON 1-B	10	10	37	37	95	95
37119000048	48	9	9	42	42	88	104
37119000216	216	8	9	41	41	103	99
37081000G27	G27	11	11	28	28	57	57
37081000G43	G43	11	11	27	28	58	62
37153000006	WOLF PIT 3	8	4	29	29	52	52
371570000MS	MOSS STREET	11	6	26	26	65	65
3716300ROWA	ROWAN	4	4	9	9	22	22
3719500PRWI	WILSON I	2	2	4	4	24	24
37119000206	206	13	10	37	37	98	98
37119000236	236	8	10	41	40	103	99

Table 11: Locations of identified individuals, Part 1 of 3. For each location, the district numbers are given for the six plans discussed here. VTDs are listed rather than the more precise census block in order to protect privacy. Rows highlighted **blue** indicate individuals who lose Democratic opportunity in at least one of the enacted plans, relative to the alternative plans. Rows highlighted **orange** indicate Black voters who lose the opportunity to be in an effective district for Black candidates of choice in at least one level. (As it turns out, every instance of lost opportunity for Black voters is also an instance of lost Democratic opportunity.)

VTD Census ID	VTD/Precinct Name	SL-174	NCLCV-Cong	SL-173	NCLCV-Sen	SL-175	NCLCV-House
37119000142	142	13	10	38	38	98	112
37081000G65	G65	11	11	27	27	58	58
37081000G70	G70	11	11	28	26	61	61
3708100H19A	H19A	10	11	27	27	60	60
3708100MON3	MON3	11	11	26	28	59	57
37183015-01	15-01	5	7	17	14	37	38
37183019-17	19-17	5	5	18	18	39	66
37183001-31	01-31	5	5	15	15	11	33
37183012-02	12-02	7	7	17	17	37	37
37119000087	87	8	9	41	41	105	105
37119000068	68	9	9	42	41	104	100
371190223.1	223.1	13	9	39	39	101	101
37119000081	81	9	9	39	39	92	101
37119000237	237	9	10	38	40	106	106
37119000127	127	13	10	37	37	98	98
37191000014	14	2	1	4	4	4	10
37183005-01	05-01	6	7	16	16	41	41
37183020-09	20-09	6	7	16	17	36	36
37183004-18	04-18	6	7	16	16	49	11
37191000010	10	2	1	4	4	10	10
37183019-21	19-21	5	5	13	18	35	66
37183001-46	01-46	5	5	18	18	34	40
37183001-50	01-50	5	5	14	14	33	38
37183016-05	16-05	5	5	14	14	21	38
37119000145	145	9	10	38	38	107	107
37183008-03	08-03	5	5	15	15	40	49
37183017-05	17-05	5	5	14	18	38	40
37183013-09	13-09	5	5	18	18	66	66
370490000N2	FORT TOTTEN	1	1	3	3	3	3
37049000002	HAVELOCK	1	1	3	3	13	13
37001000004	MORTON	7	6	25	25	64	63
37001000126	BURLINGTON 6	7	6	25	25	63	64
3700100003N	NORTH BOONE	7	6	25	25	64	64
37001000124	BURLINGTON 4	7	6	25	25	63	63
37165001-16	01-16/01	8	4	24	24	48	48
37067000063	CASH ELEMENTARY SCHOOL	12	12	31	32	75	75
37067000074	MEADOWLARK MIDDLE SCHOOL	12	12	31	31	74	74
37067000709	WARD ELEMENTARY SCHOOL	12	12	32	31	74	71
37067000065	KERNERSVILLE 7TH DAY ADVENTIST CHURCH	12	12	31	32	75	75
37067000507	SEDGE GARDEN REC CTR	12	11	32	32	71	75
371510000AE	ASHEBORO EAST	7	11	29	29	70	70
37067000905	BETHABARA MORAVIAN CH	12	12	32	31	91	72
37067000402	FOURTEENTH STREET REC	12	11	32	32	72	72
370890000FR	FLAT ROCK	14	14	48	48	113	117
3708900HV-1	HENDERSONVILLE-1	14	14	48	48	117	117
37023000039	MORGANTON 09	13	13	46	46	86	86
3710900LB34	LABORATORY	12	13	44	46	97	97
3706100WARS	WARSAW	3	4	9	9	4	4
3712900CF01	CF01	3	3	8	7	18	17
370130BELHV	BELHAVEN	1	1	3	3	79	1

Table 12: Locations of identified individuals, Part 2 of 3. For each location, the district numbers are given for the six plans discussed here. VTDs are listed rather than the more precise census block in order to protect privacy. Rows highlighted **blue** indicate individuals who lose Democratic opportunity in at least one of the enacted plans, relative to the alternative plans. Rows highlighted **orange** indicate Black voters who lose the opportunity to be in an effective district for Black candidates of choice in at least one level. (As it turns out, every instance of lost opportunity for Black voters is also an instance of lost Democratic opportunity.)

VTD Census ID	VTD/Precinct Name	SL-174	NCLCV-Cong	SL-173	NCLCV-Sen	SL-175	NCLCV-House
37037NWM117	NORTH WILLIAMS	7	7	20	20	54	54
3714100CL05	COLUMBIA	3	3	9	9	16	16
3713300BM08	BRYNN MARR	1	3	6	6	14	15
3713300NR02	NEW RIVER	1	3	6	6	15	15
37051SL78-3	Spring Lake 3	4	4	21	21	42	44
3705100G10A	STONEY POINT 2-G10	4	4	19	19	45	45
37051000G1A	CROSS CREEK 02-G1	4	4	19	19	43	42
37035000035	SWEETWATER	12	13	45	45	96	96
37035000032	SOUTH NEWTON	12	13	45	45	89	89
3705100CC32	CROSS CREEK 32	4	4	19	19	44	44
37059000007	JERUSALEM	10	8	30	30	77	77
3708500PR01	ANDERSON CREEK	4	7	12	12	6	6
3708500PR07	BARBECUE	4	7	12	12	6	6
371070000K8	KINSTON-8	1	1	3	3	12	12
37189000009	ELK	14	12	47	47	87	93
371170000BG	BEAR GRASS	2	1	2	1	23	23
371010PR12B	NORTH CLEVELAND 2	4	2	10	10	26	26
371010PR31B	SOUTHWEST CLEVELAND	4	2	10	10	53	53
3710100PR24	EAST SELMA	4	2	10	10	28	28
3714701102A	SIMPSON A	1	1	5	5	9	8
37167000003	ALBEMARLE NUMBER 3	8	8	33	33	67	67
3700700LILE	LILESVILLE	8	8	29	29	55	55
3704500KM-N	KM N	13	13	44	44	111	110
37143BETHEL	BETHEL	1	1	1	2	1	1
37147000601	CHICOD	1	1	5	5	9	9
37147001201	PACTOLUS	1	1	5	5	8	8
37159000040	NORTH WARD	10	8	33	33	76	76
3712900FP04	FP04	3	3	7	8	19	20
37129000W16	W16	3	3	7	7	20	18
37129000H11	H11	3	3	7	7	18	20
37129000H02	H02	3	3	7	7	20	20
37159000036	SOUTH WARD	10	8	33	33	76	76
37125000DHR	DEEP RIVER/HIGH FALLS/RITTER	8	7	21	21	78	51
37069000015	EAST FRANKLINTON	2	2	11	11	7	7
3719908-CRA	CRABTREE	14	14	47	47	85	85
3719700EBND	EAST BEND	12	12	36	31	77	77
37171000018	MT AIRY 8	11	12	36	36	90	90
3708700WS-2	WAYNESVILLE SOUTH 2	14	14	50	50	118	118
3715500005A	FAIRMONT	3	4	24	24	46	47
37155000028	RENNERT	3	4	24	24	47	47
37113000011	SMITHBRIDGE	14	14	50	50	120	120
3714500WDSD	WOODSDALE	2	6	23	23	2	2
3717900029A	SHILOH ELEMENTARY SCHOOL	8	8	35	35	68	69
3717900037A	NEXT LEVEL CHURCH	8	8	35	35	69	69
37169000017	WEST WALNUT COVE	11	12	31	36	91	91
37185000007	SHOCCO	2	2	2	1	27	27
37185000013	NORLINA	2	2	2	1	27	27

Table 13: Locations of identified individuals, Part 3 of 3. For each location, the district numbers are given for the six plans discussed here. VTDs are listed rather than the more precise census block in order to protect privacy. Rows highlighted **blue** indicate individuals who lose Democratic opportunity in at least one of the enacted plans, relative to the alternative plans. Rows highlighted **orange** indicate Black voters who lose the opportunity to be in an effective district for Black candidates of choice in at least one level. (As it turns out, every instance of lost opportunity for Black voters is also an instance of lost Democratic opportunity.)

References

[1] Assaf Bar-Natan, Lorenzo Najt, and Zachary Schutzmann, *The gerrymandering jumble: map projections permute districts' compactness scores*. Cartography and Geographic Information Science, Volume 47, Issue 4, 2020, 321–335.

[2] Richard Barnes and Justin Solomon, *Gerrymandering and Compactness: Implementation Flexibility and Abuse.* Political Analysis, Volume 29, Issue 4, October 2021, 448–466.

[3] Amariah Becker, Moon Duchin, Dara Gold, and Sam Hirsch, *Computational redistricting and the Voting Rights Act.* Election Law Journal.
Available at https://www.liebertpub.com/doi/epdf/10.1089/elj.2020.0704

[4] Christopher Cooper, Blake Esselstyn, Gregory Herschlag, Jonathan Mattingly, and Rebecca Tippett, *NC General Assembly County Clusterings from the 2020 Census.*
https://sites.duke.edu/quantifyinggerrymandering/files/2021/08/countyClusters2020.pdf

[5] Moon Duchin, Taissa Gladkova, Eugene Henninger-Voss, Heather Newman, and Hannah Wheelen, *Locating the Representational Baseline: Republicans in Massachusetts.* Election Law Journal, Volume 18, Number 4, 2019, 388–401.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 23 day of December, 2021.

Professor Moon Duchin

Sworn and subscribed before me
this the 23rd of December, 2021

SHANNON C PETERSON
Notary Public
State of Colorado
Notary ID # 20214018369
My Commission Expires 05-10-2025

Notary Public

Name: Shannon C Peterson

My commission expires: 05/10/2025

Moon Duchin

moon.duchin@tufts.edu - mduchin.math.tufts.edu
Mathematics · STS · Tisch College of Civic Life | Tufts University

Education

University of Chicago MS 1999, PhD 2005
Mathematics
Advisor: Alex Eskin Dissertation: *Geodesics track random walks in Teichmüller space*

Harvard University BA 1998
Mathematics and Women's Studies

Appointments

Tufts University
Professor of Mathematics 2021—
Assistant Professor, Associate Professor 2011–2021

Director | Program in Science, Technology, & Society 2015–2021
(on leave 2018–2019)

Principal Investigator | MGGG Redistricting Lab 2017—

Senior Fellow | Tisch College of Civic Life 2017—

University of Michigan
Assistant Professor (postdoctoral) 2008–2011

University of California, Davis
NSF VIGRE Postdoctoral Fellow 2005–2008

Research Interests

Data science for civil rights, computation and governance, elections, geometry and redistricting.
Science, technology, and society, science policy, technology and law.
Random walks and Markov chains, random groups, random constructions in geometry.
Large-scale geometry, metric geometry, isoperimetric inequalities.
Geometric group theory, growth of groups, nilpotent groups, dynamics of group actions.
Geometric topology, hyperbolicity, Teichmüller theory.

Awards & Distinctions

Research Professor - MSRI Program in Analysis and Geometry of Random Spaces Spring 2022
Guggenheim Fellow 2018
Radcliffe Fellow - Evelyn Green Davis Fellowship 2018–2019
Fellow of the American Mathematical Society elected 2017
NSF C-ACCEL (PI) - Harnessing the Data Revolution: Network science of Census data 2019–2020
NSF grants (PI) - CAREER grant and three standard Topology grants 2009–2022
Professor of the Year, Tufts Math Society 2012–2013
AAUW Dissertation Fellowship 2004–2005
NSF Graduate Fellowship 1998–2002
Lawrence and Josephine Graves Prize for Excellence in Teaching (U Chicago) 2002
Robert Fletcher Rogers Prize (Harvard Mathematics) 1995–1996

Mathematics Publications & Preprints

The (homological) persistence of gerrymandering
Foundations of Data Science, online first. (with Thomas Needham and Thomas Weighill)

You can hear the shape of a billiard table: Symbolic dynamics and rigidity for flat surfaces
Commentarii Mathematici Helvetici, to appear. arXiv:1804.05690
(with Viveka Erlandsson, Christopher Leininger, and Chandrika Sadanand)

Conjugation curvature for Cayley graphs
Journal of Topology and Analysis, online first. (with Assaf Bar-Natan and Robert Kropholler)

A reversible recombination chain for graph partitions
Preprint. (with Sarah Cannon, Dana Randall, and Parker Rule)

Recombination: A family of Markov chains for redistricting
Harvard Data Science Review. Issue 3.1, Winter 2021. online. (with Daryl DeFord and Justin Solomon)

Census TopDown: The impact of differential privacy on redistricting
2nd Symposium on Foundations of Responsible Computing (FORC 2021), 5:1–5:22. online.
(with Aloni Cohen, JN Matthews, and Bhushan Suwal)

Stars at infinity in Teichmüller space
Geometriae Dedicata, Volume 213, 531–545 (2021). (with Nate Fisher) arXiv:2004.04321

Random walks and redistricting: New applications of Markov chain Monte Carlo
(with Daryl DeFord) For edited volume, Political Geometry. Under contract with Birkhäuser.

Mathematics of nested districts: The case of Alaska
Statistics and Public Policy. Vol 7, No 1 (2020), 39–51. (w/ Sophia Caldera, Daryl DeFord, Sam Gutekunst, & Cara Nix)

A computational approach to measuring vote elasticity and competitiveness
Statistics and Public Policy. Vol 7, No 1 (2020), 69–86. (with Daryl DeFord and Justin Solomon)

The Heisenberg group is pan-rational
Advances in Mathematics **346** (2019), 219–263. (with Michael Shapiro)

Random nilpotent groups I
IMRN, Vol 2018, Issue 7 (2018), 1921–1953. (with Matthew Cordes, Yen Duong, Meng-Che Ho, and Ayla Sánchez)

Hyperbolic groups
chapter in *Office Hours with a Geometric Group Theorist*, eds. M.Clay,D.Margalit, Princeton U Press (2017), 177–203.

Counting in groups: Fine asymptotic geometry
Notices of the American Mathematical Society **63**, No. 8 (2016), 871–874.

A sharper threshold for random groups at density one-half
Groups, Geometry, and Dynamics **10**, No. 3 (2016), 985–1005.
(with Katarzyna Jankiewicz, Shelby Kilmer, Samuel Lelièvre, John M. Mackay, and Ayla Sánchez)

Equations in nilpotent groups
Proceedings of the American Mathematical Society **143** (2015), 4723–4731. (with Hao Liang and Michael Shapiro)

Statistical hyperbolicity in Teichmüller space
Geometric and Functional Analysis, Volume 24, Issue 3 (2014), 748–795. (with Howard Masur and Spencer Dowdall)

Fine asymptotic geometry of the Heisenberg group
Indiana University Mathematics Journal 63 No. 3 (2014), 885–916. (with Christopher Mooney)

Pushing fillings in right-angled Artin groups
Journal of the LMS, Vol 87, Issue 3 (2013), 663–688. (with Aaron Abrams, Noel Brady, Pallavi Dani, and Robert Young)

Spheres in the curve complex
In the Tradition of Ahlfors and Bers VI, Contemp. Math. **590** (2013), 1–8. (with Howard Masur and Spencer Dowdall)

The sprawl conjecture for convex bodies
Experimental Mathematics, Volume 22, Issue 2 (2013), 113–122. (with Samuel Lelièvre and Christopher Mooney)

Filling loops at infinity in the mapping class group
Michigan Math. J., Vol 61, Issue 4 (2012), 867–874. (with Aaron Abrams, Noel Brady, Pallavi Dani, and Robert Young)

The geometry of spheres in free abelian groups
Geometriae Dedicata, Volume 161, Issue 1 (2012), 169–187. (with Samuel Lelièvre and Christopher Mooney)

Statistical hyperbolicity in groups
Algebraic and Geometric Topology **12** (2012) 1–18. (with Samuel Lelièvre and Christopher Mooney)

Length spectra and degeneration of flat metrics
Inventiones Mathematicae, Volume 182, Issue 2 (2010), 231–277. (with Christopher Leininger and Kasra Rafi)

Divergence of geodesics in Teichmüller space and the mapping class group
Geometric and Functional Analysis, Volume 19, Issue 3 (2009), 722–742. (with Kasra Rafi)

Curvature, stretchiness, and dynamics
In the Tradition of Ahlfors and Bers IV, Contemp. Math. **432** (2007), 19–30.

Geodesics track random walks in Teichmüller space
PhD Dissertation, University of Chicago 2005.

Science, Technology, Law, and Policy Publications & Preprints

Models, Race, and the Law
Yale Law Journal Forum, Vol. 130 (March 2021). Available online. (with Doug Spencer)

Computational Redistricting and the Voting Rights Act
Election Law Journal, Available online. (with Amariah Becker, Dara Gold, and Sam Hirsch)

Discrete geometry for electoral geography
Preprint. (with Bridget Eileen Tenner) arXiv:1808.05860

Implementing partisan symmetry: Problems and paradoxes
Political Analysis, to appear. (with Daryl DeFord, Natasha Dhamankar, Mackenzie McPike, Gabe Schoenbach, and Ki-Wan Sim) arXiv:2008:06930

Clustering propensity: A mathematical framework for measuring segregation
Preprint. (with Emilia Alvarez, Everett Meike, and Marshall Mueller; appendix by Tyler Piazza)

Locating the representational baseline: Republicans in Massachusetts
Election Law Journal, Volume 18, Number 4, 2019, 388–401.
(with Taissa Gladkova, Eugene Henninger-Voss, Ben Klingensmith, Heather Newman, and Hannah Wheelen)

Redistricting reform in Virginia: Districting criteria in context
Virginia Policy Review, Volume XII, Issue II, Spring 2019, 120–146. (with Daryl DeFord)

Geometry v. Gerrymandering
The Best Writing on Mathematics 2019, ed. Mircea Pitici. Princeton University Press.
reprinted from Scientific American, November 2018, 48–53.

Gerrymandering metrics: How to measure? What's the baseline?
Bulletin of the American Academy for Arts and Sciences, Vol. LXII, No. 2 (Winter 2018), 54–58.

Rebooting the mathematics of gerrymandering: How can geometry track with our political values?
The Conversation (online magazine), October 2017. (with Peter Levine)

A formula goes to court: Partisan gerrymandering and the efficiency gap
Notices of the American Mathematical Society **64** No. 9 (2017), 1020–1024. (with Mira Bernstein)

International mobility and U.S. mathematics
Notices of the American Mathematical Society **64**, No. 7 (2017), 682–683.

Graduate Advising in Mathematics

Nate Fisher (PhD 2021), Sunrose Shrestha (PhD 2020), Ayla Sánchez (PhD 2017), Kevin Buckles (PhD 2015), Mai Mansouri (MS 2014)

Outside committee member for Chris Coscia (PhD 2020), Dartmouth College

Postdoctoral Advising in Mathematics

Principal supervisor Thomas Weighill (2019–2020)

Co-supervisor Daryl DeFord (MIT 2018–2020), Rob Kropholler (2017–2020), Hao Liang (2013–2016)

Teaching

Courses Developed or Customized

Mathematics of Social Choice | sites.tufts.edu/socialchoice
Voting theory, impossibility theorems, redistricting, theory of representative democracy, metrics of fairness.

History of Mathematics | sites.tufts.edu/histmath
Social history of mathematics, organized around episodes from antiquity to present. Themes include materials and technologies of creation and dissemination, axioms, authority, credibility, and professionalization. In-depth treatment of mathematical content from numeration to cardinal arithmetic to Galois theory.

Reading Lab: Mathematical Models in Social Context | sites.tufts.edu/models
One hr/wk discussion seminar of short but close reading on topics in mathematical modeling, including history of psychometrics; algorithmic bias; philosophy of statistics; problems of model explanation and interpretation.

Geometric Literacy
Module-based graduate topics course. Modules have included: p-adic numbers, hyperbolic geometry, nilpotent geometry, Lie groups, convex geometry and analysis, the complex of curves, ergodic theory, the Gauss circle problem.

Markov Chains (graduate topics course)
Teichmüller Theory (graduate topics course)
Fuchsian Groups (graduate topics course)
Continued Fractions and Geometric Coding (undergraduate topics course)
Mathematics for Elementary School Teachers

Standard Courses

Discrete Mathematics, Calculus I-II-III, Intro to Proofs, Linear Algebra, Complex Analysis, Differential Geometry, Abstract Algebra, Graduate Real Analysis, Mathematical Modeling and Computation

Weekly Seminars Organized

- Geometric Group Theory and Topology
- Science, Technology, and Society Lunch Seminar

Selected Talks and Lectures

Distinguished Plenary Lecture June 2021
75th Anniversary Meeting of Canadian Mathematical Society, Ottawa, Ontario *online (COVID)*

BMC/BAMC Public Lecture April 2021
Joint British Mathematics/Applied Mathematics Colloquium, Glasgow, Scotland *online (COVID)*

AMS Einstein Public Lecture in Mathematics [March 2020]
Southeastern Sectional Meeting of the AMS, Charlottesville, VA *postponed*

Gerald and Judith Porter Public Lecture
AMS-MAA-SIAM, Joint Mathematics Meetings, San Diego, CA January 2018

Mathematical Association of America Distinguished Lecture
MAA Carriage House, Washington, DC October 2016

American Mathematical Society Invited Address
AMS Eastern Sectional Meeting, Brunswick, ME September 2016

Named University Lectures

- Parsons Lecture | UNC Asheville — October 2020
- Loeb Lectures in Mathematics | Washington University in St. Louis — [March 2020]
- Math, Stats, CS, and Society | Macalester College — October 2019
- MRC Public Lecture | Stanford University — May 2019
- Freedman Memorial Colloquium | Boston University — March 2019
- Julian Clancy Frazier Colloquium Lecture | U.S. Naval Academy — January 2019
- Barnett Lecture | University of Cincinnati — October 2018
- School of Science Colloquium Series | The College of New Jersey — March 2018
- Kieval Lecture | Cornell University — February 2018
- G. Milton Wing Lectures | University of Rochester — October 2017
- Norman Johnson Lecture | Wheaton College — September 2017
- Dan E. Christie Lecture | Bowdoin College — September 2017

Math/Computer Science Department Colloquia

- Reed College — Dec 2020
- Georgetown (CS) — Sept 2020
- Santa Fe Institute — July 2020
- UC Berkeley — Sept 2018
- Brandeis-Harvard-MIT-NEU — Mar 2018
- Northwestern University — Oct 2017
- University of Illinois — Sept 2017
- University of Utah — Aug 2017
- Wesleyan — Dec 2016
- Worcester Polytechnic Inst. — Dec 2016
- Université de Neuchâtel — Jun 2016
- Brandeis University — Mar 2016
- Swarthmore College — Oct 2015
- Bowling Green — May 2015
- City College of New York — Feb 2015
- Indiana University — Nov 2014
- the Technion — Oct 2014
- Wisconsin–Madison — Sept 2014
- Stony Brook — March 2013

Minicourses

- Integer programming and combinatorial optimization (two talks) | Georgia Tech — May 2021
- Workshop in geometric topology (main speaker, three talks) | Provo, UT — June 2017
- Growth in groups (two talks) | MSRI, Berkeley, CA — August 2016
- Hyperbolicity in Teichmüller space (three talks) | Université de Grenoble — May 2016
- Counting and growth (four talks) | IAS Women's Program, Princeton — May 2016
- Nilpotent groups (three talks) | Seoul National University — October 2014
- Sub-Finsler geometry of nilpotent groups (five talks) | Galatasaray Univ., Istanbul — April 2014

Science, Technology, and Society

- The Mathematics of Accountability | Sawyer Seminar, Anthropology, Johns Hopkins — February 2020
- STS Circle | Harvard Kennedy School of Government — September 2019
- Data, Classification, and Everyday Life Symposium | Rutgers Center for Cultural Analysis — January 2019
- Science Studies Colloquium | UC San Diego — January 2019
- Arthur Miller Lecture on Science and Ethics | MIT Program in Science, Tech, and Society — November 2018

Data Science, Computer Science, Quantitative Social Science

- Data Science for Social Good Workshop (DS4SG) | Georgia Tech (virtual) — November 2020
- Privacy Tools Project Retreat | Harvard (virtual) — May 2020
- Women in Data Science Conference | Microsoft Research New England — March 2020
- Quantitative Research Methods Workshop | Yale Center for the Study of American Politics — February 2020
- Societal Concerns in Algorithms and Data Analysis | Weizmann Institute — December 2018
- Quantitative Collaborative | University of Virginia — March 2018
- Quantitative Social Science | Dartmouth College — September 2017
- Data for Black Lives Conference | MIT — November 2017

Political Science, Geography, Law, Democracy, Fairness

- The Long 19th Amendment: Women, Voting, and American Democracy | Radcliffe Institute — Nov–Dec 2020
- "The New Math" for Civil Rights | Social Justice Speaker Series, Davidson College — November 2020
- Math, Law, and Racial Fairness | Justice Speaker Series, University of South Carolina — November 2020
- Voting Rights Conference | Northeastern Public Interest Law Program — September 2020
- Political Analysis Workshop | Indiana University — November 2019
- Program in Public Law Panel | Duke Law School — October 2019
- Redistricting 2021 Seminar | University of Chicago Institute of Politics — May 2019
- Geography of Redistricting Conference Keynote | Harvard Center for Geographic Analysis — May 2019
- Political Analytics Conference | Harvard University — November 2018
- Cyber Security, Law, and Society Alliance | Boston University — September 2018
- Clough Center for the Study of Constitutional Democracy | Boston College — November 2017
- Tech/Law Colloquium Series | Cornell Tech — November 2017
- Constitution Day Lecture | Rockefeller Center for Public Policy, Dartmouth College — September 2017

Editorial Boards

Harvard Data Science Review
Associate Editor — since 2019

Advances in Mathematics
Member, Editorial Board — since 2018

Selected Professional and Public Service

Amicus Brief of Mathematicians, Law Professors, and Students 2019
principal co-authors: Guy-Uriel Charles and Moon Duchin

Supreme Court of the United States, in Rucho v. Common Cause - cited in dissent

Committee on Science Policy 2020–2023
American Mathematical Society

Program Committee 2020–2021
Symposium on Foundations of Responsible Computing

Presenter on Public Mapping, Statistical Modeling 2019, 2020
National Conference of State Legislatures

Committee on the Human Rights of Mathematicians 2016–2019
American Mathematical Society

Committee on The Future of Voting: Accessible, Reliable, Verifiable Technology 2017–2018
National Academies of Science, Engineering, and Medicine

Visiting Positions and Residential Fellowships

Visiting Professor Department of Mathematics Fall 2021
Boston College | Chestnut Hill, MA

Fellow Radcliffe Institute for Advanced Study 2018–19
Harvard University | Cambridge, MA

Member Center of Mathematical Sciences and Applications 2018–19
Harvard University | Cambridge, MA

Visitor Microsoft Research Lab 2018–19
MSR New England | Cambridge, MA

Research Member Geometric Group Theory program Fall 2016
Mathematical Sciences Research Institute | Berkeley, CA

Research Member Random Walks and Asymptotic Geometry of Groups program Spring 2014
Institut Henri Poincaré | Paris, France

Research Member Low-dimensional Topology, Geometry, and Dynamics program Fall 2013
Institute for Computational and Experimental Research in Mathematics | Providence, RI

Research Member Geometric and Analytic Aspects of Group Theory program May 2012
Institut Mittag-Leffler | Stockholm, Sweden

Research Member Quantitative Geometry program Fall 2011
Mathematical Sciences Research Institute | Berkeley, CA

Postdoctoral Fellow Teichmüller "project blanc" Spring 2009
Agence Nationale de la Recherche (Collège de France) | Paris, France

STATE OF NORTH CAROLINA

COUNTY OF WAKE

IN THE GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
No. 21 CVS 015426
No. 21 CVS 500085

NORTH CAROLINA LEAGUE OF CONSERVATION VOTERS, INC., *et al.*,

Plaintiffs,

v.

REPRESENTATIVE DESTIN HALL, IN HIS OFFICIAL CAPACITY AS SENIOR CHAIR OF THE HOUSE STANDING COMMITTEE ON REDISTRICTING, *et al.*,

Defendants.

REBECCA HARPER, *et al.*,

Plaintiffs,

v.

REPRESENTATIVE DESTIN HALL, IN HIS OFFICIAL CAPACITY AS SENIOR CHAIR OF THE HOUSE STANDING COMMITTEE ON REDISTRICTING, *et al.*,

Defendants.

COMMON CAUSE, *et al.*,

Plaintiffs,

v.

REPRESENTATIVE DESTIN HALL, IN HIS OFFICIAL CAPACITY AS SENIOR CHAIR OF THE HOUSE STANDING COMMITTEE ON REDISTRICTING, *et al.*,

Defendants.

PROPOSED JOINT STIPULATIONS OF FACT

Pursuant to the Court's December 13, 2021 Case Scheduling Order, the parties hereby stipulate to the following facts:

THE PARTIES

1. The plaintiffs in this action are:

a. North Carolina League of Conservation Voters, Inc.; Henry M. Michaux, Jr.; Dandrielle Lewis; Timothy Chartier; Talia Fernos; Katherine Newhall; R. Jason Parsley; Edna Scott; Roberta Scott; Yvette Roberts; Jereann King Johnson; Reverend Reginald Wells; Yarbrough Williams, Jr.; Reverend Deloris L. Jerman; Viola Ryals Figueroa; and Cosmos George (collectively the "NCLCV Plaintiffs").

b. Rebecca Harper; Amy Clare Oseroff; Donald Rumph; John Anthony Balla; Richard R. Crews; Lily Nicole Quick; Gettys Cohen Jr.; Shawn Rush; Mark S. Peters; Kathleen Barnes; Virginia Walters Brien; Eileen Stephens; Barbara Proffitt; Mary Elizabeth Voss; Chenita Barber Johnson; Sarah Taber; Joshua Perry Brown; Laureen Floor; Donald M. MacKinnon; Ron Osborne; Ann Butzner; Sondra Stein; Bobby Jones; Kristiann Herring; and David Dwight Brown (collectively the "Harper Plaintiffs").

c. Common Cause.

2. The defendants in this action are as follows:

a. Destin Hall, in his official capacity as Chairman of the House Standing Committee on Redistricting; Ralph E. Hise, Jr., Warren Daniel, Paul Newton, in their official capacities as Co-Chairmen of the Senate Committee on Redistricting and Elections; Philip E. Berger, in his official capacity as President Pro Tempore of the North Carolina Senate; Timothy

K. Moore, in his official capacity as Speaker of the North Carolina House of Representatives (collectively "Legislative Defendants");

b. The State of North Carolina; The North Carolina State Board of Elections; Damon Circosta, in his official capacity as Chair of the State Board of Elections; Stella Anderson, in her official capacity as Secretary of the State Board of Elections; Stacy Eggers IV, in his official capacity as Member of the State Board of Elections; Jeff Carmon III, in his official capacity as Member of the State Board of Elections; Tommy Tucker, in his official capacity as Member of the State Board of Elections; Karen Brinson Bell, in her official capacity as Executive Director of the State Board of Elections (collectively "State Defendants")

3. The NCLCV Plaintiffs' Complaint, filed November 16, 2021, alleges that the 2021 districting plans for Congress, the North Carolina Senate, and the North Carolina House of Representatives violate the North Carolina Constitution by establishing severe partisan gerrymanders in violation of the Free Elections Clause, Art. I, § 10, the Equal Protection Clause, Art. I, § 19, and the Freedom of Speech and Assembly Clauses, Art. I, §§ 12, 14; by engaging in racial vote dilution in violation of the Free Elections Clause, Art. I, § 10, and the Equal Protection Clause, Art. I, § 19; and by violating the Whole County Provisions, Art. II, §§ 3(3), 5(3).

4. Harper Plaintiffs' Amended Complaint, filed December 12, 2021, alleges that the 2021 districting plans for Congress, the North Carolina Senate, and the North Carolina House of Representatives violate the North Carolina Constitution—namely its Free Elections Clause, Art. I, § 10; its Equal Protection Clause, Art. I, § 19; and its Freedom of Speech and Freedom of Assembly Clauses, Art. I, §§ 12, 14.

5. Plaintiff Common Cause's Complaint, filed December 16, 2021, alleges that the 2021 districting plans for Congress, the North Carolina Senate, and the North Carolina House of Representatives violate the North Carolina Constitution—namely its Equal Protection Clause, Art. I, § 19; its Free Elections Clause, Art. I, § 10; and its Freedom of Speech and Freedom of Assembly Clauses, Art. I, §§ 12, 14—and seeks, among other relief, a declaratory ruling under the Declaratory Judgment Act.

6. Defendant Ralph E. Hise, Jr. is a Republican member of the North Carolina Senate, representing Senate District 47, and the Chairman of the Senate Standing Committee on Redistricting and Elections. Defendant Hise is sued in his official capacity only. Defendant Hise resides in Senate District 47 in the 2021 districting plan.

7. Defendant Warren Daniel is a Republican member of the North Carolina Senate, representing Senate District 46, and the Chairman of the Senate Standing Committee on Redistricting and Elections. Defendant Daniel is sued in his official capacity only. Defendant Daniel resides in Senate District 46 in the 2021 districting plan.

8. Defendant Paul Newton is a Republican member of the North Carolina Senate, representing Senate District 36, and the Chairman of the Senate Standing Committee on Redistricting and Elections. Defendant Newton is sued in his official capacity only. Defendant Newton resides in Senate District 34 in the 2021 districting plan.

9. Representative Destin Hall is Republican member of the North Carolina House of Representatives, representing House District 87, and the Chairman of the House Standing Committee on Redistricting. Defendant Hall is sued in his official capacity only. Defendant Hall resides in House District 87 in the 2021 districting plan.

10. Defendant Timothy K. Moore is a Republican member and the Speaker of the North Carolina House of Representatives, representing House District 111. Defendant Moore is sued in his official capacity only. Defendant Moore resides in House District 111 in the 2021 districting plan.

11. Defendant Philip E. Berger is a Republican member and the President Pro Tempore of the North Carolina Senate, representing Senate District 30. Defendant Berger is sued in his official capacity only. Defendant Berger resides in Senate District 26 in the 2021 districting plan.

BACKGROUND

12. Following each decennial census, the North Carolina General Assembly must redraw the districts for the North Carolina House of Representatives, the North Carolina Senate, and the North Carolina Congressional map.

13. In North Carolina, legislative redistricting is performed exclusively by the General Assembly. The Governor of North Carolina has no power to veto redistricting bills.

14. The State Constitution specifically enumerates four limitations upon the redistricting and reapportionment authority of the General Assembly, including that:

a. Each Senator and Representative shall represent, as nearly as possible, an equal number of inhabitants;

b. Each senate and representative district shall at all times consist of contiguous territory;

c. No county shall be divided in the formation of senator or representative districts (the "Whole County Provision"); and

d. Once established, the senate and representative districts and the apportionment of Senators and Representatives shall remain unaltered until the next decennial census of population taken by order of Congress.

15. Between 1870 and 2010, Democrats at all times controlled one or both houses of the General Assembly.

16. After the 2010 election, for the first time since 1870, Republicans constituted a majority of both the North Carolina House of Representatives and the North Carolina Senate.

17. Republicans have constituted a majority in both the North Carolina House of Representatives and the North Carolina Senate from 2010 to present day and have therefore controlled each of the last two cycles of redistricting in North Carolina.

THE 2021 REDISTRICTING PROCESS

Census Data

18. On February 12, 2021, the U.S. Census Bureau announced that its release of P.L. 94-171 redistricting data would be delayed by the COVID-19 pandemic, and would not be released until the fall of 2021, and specifically that it would deliver the Public Law 94.171 redistricting data to all states by September 30, 2021.[1]

19. On February 24, 2021, the North Carolina State Board of Elections Executive Director Karen Brinson Bell presented recommendations to the House Elections Law and Campaign Finance Reform Committee to move the 2022 primary to a May 3 primary, July 12 second primary, and November 8 general election.[2]

---

[1] Press Release, U.S. Census Bureau, Census Bureau Statement on Redistricting Data Timeline (Feb. 12, 2021), https://www.census.gov/newsroom/press-releases/2021/statement-redistricting-data-timeline.html.

[2] North Carolina State Board of Elections, *A Look Back at North Carolina's Historic 2020 Election & Looking Ahead at 2021*, *Presentation to House Election Law & Campaign Finance Reform Committee* at p. 14, Feb. 24, 2021, 2021–2022 Session (N.C. 2021),

20. On March 15, 2021, the United States Census Bureau announced that it would release a "legacy" format summary redistricting data file to all states by mid-to-late August 2021, in addition to the "tabulated" P.L. 94-171 block-level data released before September 30, 2021, "[i]n recognition of the difficulties this timeline creates for states with redistricting and election deadlines prior to Sept. 30."[3]

21. On April 26, 2021, the United States Census Bureau released data indicating that North Carolina's population increased from 9,535,483 residents in 2010[4] to 10,439,388 residents in 2020.[5] This 9.5 percent population increase resulted in North Carolina being given an additional Congressional seat following the 2020 Census, resulting in North Carolina's congressional delegation growing from 13 to 14 members.[6]

22. On August 12, 2021, the U.S. Census Bureau released the 2020 Census Redistricting Data (Public Law 94-171) Summary File for all states, including North Carolina, in "legacy" format.[7]

---

https://www.ncleg.gov/documentsites/committees/House2021-21/02-24-21/House%20Elections%20Committee%20Presentation%202-24-2021%20FINALv2.pdf.

[3] U.S. Census Bureau, *U.S. Census Bureau Statement on Release of Legacy Format Summary Redistricting Data File* (Mar. 15, 2021), https://www.census.gov/newsroom/press-releases/2021/statement-legacy-format-redistricting.html.

[4] U.S. Census Bureau, *North Carolina: 2010: Population and Housing Unit Census* (2021), https://www.census.gov/prod/cen2010/cph-2-35.pdf.

[5] *See* U.S. Census Bureau, *2020 Census Apportionment Results Delivered to the President* (Apr. 27, 2021); https://www.census.gov/newsroom/press-releases/2021/2020-census-apportionment-results.html; *North Carolina: 2020 Census*, U.S. CENSUS BUREAU (Aug. 25, 2021), https://www.census.gov/library/stories/state-by-state/north-carolina-population-change-between-census-decade.html.

[6] *2020 Census: Apportionment of the U.S. House of Representatives*, U.S. CENSUS BUREAU (Apr. 26, 2021), https://www.census.gov/library/visualizations/2021/dec/2020-apportionment-map.html.

[7] *See* U.S. Census Bureau, *U.S. Census Bureau Delivers Data for States to Begin Redistricting Efforts* (Aug. 12, 2021), https://www.census.gov/newsroom/press-releases/2021/population-changes-nations-diversity.html.

The Redistricting Committee Criteria & Map Drawing Process

23. On Thursday, August 5, 2021 at 2:00 PM, the Senate Committee on Redistricting and Elections convened a Joint Meeting of the Senate Redistricting and Elections Committee and the House Redistricting Committee to begin discussion on the redistricting process.[8]

24. Following this meeting, staff member Erika Churchill distributed to the joint committee members the legislative redistricting criteria ordered by the North Carolina Superior Court for Wake County in its September 3, 2019 Judgment in the matter *Common Cause v. Lewis*, No. 18 CVS 014001, 2019 N.C. Super. LEXIS 56 (the "2019 Criteria").

25. On Monday, August 9, 2021 the redistricting chairs of the joint committees released the "2021 Joint Redistricting Committee Proposed Criteria," a copy of which appears at https://ncleg.gov/documentsites/committees/Senate2021-154/2021/08-09-2021/2021%20Joint%20Redistricting%20Committee%20Plan%20Proposed%20Criteria.pdf.

26. The Joint Redistricting Committees received in-person public comment on the Proposed Criteria on Tuesday, August 10, 2021 beginning at 8:30 AM.

27. On Thursday, August 12, 2021, the Joint Redistricting Committees convened to debate and vote on the 2021 Joint Redistricting Committee Proposed Criteria.

28. That same day, the Joint Redistricting Committees adopted the final redistricting criteria, a copy of which appears at: https://ncleg.gov/documentsites/committees/Senate2021-154/2021/08-12-2021/Criteria.adopted.8.12.pdf.

---

[8] *Joint Meeting of the Senate Redistricting and Elections Committee and the House Redistricting Committee to Begin Discussion on the Redistricting Process*, Aug. 5, 2021, 2021–2022 Session (N.C. 2021), https://ncleg.gov/documentsites/committees/Senate2021-154/2021/08-05-2021/6683.pdf.

29. On Wednesday, September 1, 2021, the Joint Redistricting Committees announced a Joint Public Hearing Schedule, that would consist of 13 public hearings held from September 8, 2021 through September 30, 2021.[9]

30. On Tuesday, October 5, 2021, the Senate Committee on Redistricting and Elections and the House Committee on Redistricting each convened separately. In both meetings, the Redistricting Chairs announced utilization of county groupings described in the academic paper *N.C. General Assembly County Clusterings from the 2020 Census* (the "Duke Academic Paper"), published on the Duke University website "Quantifying Gerrymandering."[10]

31. In the meeting of the Senate Committee on Redistricting and Elections, Defendant Hise provided the set of sixteen possible Senate cluster options, based upon the Duke Academic Paper, that constituted the set of options eligible for adoption (the "Duke Senate Clusters"). *See* "Duke Senate Groupings Maps 11x17."[11]

32. In the meeting of the House Committee on Redistricting, Defendant Hall provided the set of eight possible House cluster options, based upon the Duke Academic Paper, that

[9] 9.1.21 released Hearing schedule: https://www.ncleg.gov/documentsites/committees/House2021-182/2021/Public%20Hearing%20Schedule.pdf

9.13.21 released Hearing schedule with addresses: https://www.ncleg.gov/documentsites/committees/House2021-182/2021/Public%20Hearing%20Schedule%20with%20addresses.pdf

[10] Christopher Cooper et al., *NC General Assembly County Clusterings from the 2020 Census*, QUANTIFYING GERRYMANDERING (Aug. 17, 2021), https://sites.duke.edu/quantifyinggerrymandering/files/2021/08/countyClusters2020.pdf.

[11] *Duke Senate Groupings Maps 11x17*, North Carolina Senate Redistricting and Elections Committee, Oct. 5, 2021, 2021–2022 Session (N.C. 2021), https://ncleg.gov/documentsites/committees/Senate2021-154/2021/10-05-2021/Duke%20Senate%20Groupings%20Maps%2011x17.pdf.

constituted the set of options eligible for adoption (the "Duke House Clusters"). *See* "Duke House Groupings Maps 11x17.pdf."[12]

33. On Friday, October 8, 2021, Legislative Defendants received a letter from Allison J. Riggs, current counsel for Plaintiff Common Cause, concerning the county clustering option maps introduced on Tuesday, October 5, 2021.[13]

34. On Monday, October 25, 2021, Legislative Defendants received a second letter from Allison J. Riggs, current counsel for Plaintiff Common Cause, concerning draft Senate map, "SST-4".[14]

35. A placeholder version of the state House Map was filed on Thursday, October 28, 2021 as House Bill 976 ("HB976") where it passed its first reading. A committee substitute ("HBK-14") received a favorable review and, after one amendment, passed its second and third readings on the House and its first reading in the Senate on November 2, 2021. It received a favorable report from the Senate Redistricting Committee on November 3, 2021 without alteration and passed its second and third readings on November 4, 2021.

36. HB976 was ratified into law on November 4, 2021 as S.L. 2021-175.

37. A proposed version of the state Senate map ("SST-13") was filed on Friday, October 29, 2021 as Senate Bill 739 ("SB739") and received its first reading in the Senate that day. It was then referred to the Senate Redistricting Committee on November 1 where the Redistricting Committee adopted a substitute along party lines ("SBK-7"). On November 2,

---

[12] *Duke House Groupings Maps 11x17*, North Carolina House Redistricting Committee, Oct. 5, 2021, 2021–2022 Session (N.C. 2021), https://ncleg.gov/documentsites/committees/House2021-182/2021/October%205,%202021/Duke%20House%20Groupings%20Maps%2011x17.pdf.

[13] Letter from SCSJ Attorneys to Legislative Defendants, Oct. 8, 2021, https://southerncoalition.org/wp-content/uploads/2021/10/SCSJ-correspondence_NCGA-redistricting_2021.10.082.pdf.

[14] Letter from SCSJ Attorneys to Legislative Defendants, Oct. 25, 2021, https://southerncoalition.org/wp-content/uploads/2021/10/SCSJ-Letter-Senate-Map-10-25-21-FINAL.pdf.

Senator Marcus offered an amendment entitled "SBVAmend-2" to the Senate Redistricting Committee.[15] Senator Clark also offered an amendment entitled "SCGAmend-3" to the Senate Redistricting Committee.[16] Both amendments were adopted and included in the final version of SB739. The bill then passed its second and third readings in the Senate by November 3 along party lines, and passed all three readings and the House Redistricting Committee without any alteration on November 3 – 4, 2021.

38. SB739 was ratified into law on November 4, 2021 as S.L. 2021-173.

39. A proposed Congressional map ("CST-13") was filed on October 29, 2021 as Senate Bill 740 ("SB740") and passed its first reading and received a favorable report from the Senate Redistricting Committee on November 1, 2021. It proceeded unaltered through its second and third readings in the Senate and its first reading in the House on November 2, received a favorable report from the House Redistricting Committee on November 3, and proceeded unaltered through its second and third readings in the House on November 4, 2021.

40. SB740 was ratified into law on November 4, 2021 as S.L. 2021-174.

41. The State House, State Senate and Congressional Maps all passed along party lines.

42. The State House map, HB976, passed the House on a strict party line vote, with 67 Republican Representatives in favor and 49 Democratic Representatives opposed. HB976 also passed the Senate on a strict party line vote, with 25 Republican Senators in favor and 21 Democratic Senators opposed.

---

[15] https://www.ncleg.gov/documentsites/committees/Senate2021-154/2021/11-02-2021/Adopted%20Amendments/S739-ATU-40.printing.pdf

[16] https://www.ncleg.gov/documentsites/committees/Senate2021-154/2021/11-02-2021/Adopted%20Amendments/S739-ABA-40.printing.pdf

43. The State Senate map, SB739, passed the Senate on a strict party line vote, with 26 Republican Senators in favor and 19 Democratic Senators opposed. SB739 also passed the House on a strict party line vote, with 65 Republican Representatives in favor and 49 Democratic Representatives opposed.

44. The Congressional map, SB740, passed the Senate on a strict party line vote, with 27 Republican Senators in favor and 22 Democratic Senators opposed. SB740 also passed the House on a strict party line vote, with 65 Republican Representatives in favor and 49 Democratic Representatives opposed.

GENERAL REDISTRICTING PROCESS STIPULATIONS

45. All parties stipulate and agree that any party may cite, discuss, and otherwise rely on as admitted evidence, publicly available legislative records from the website of the North Carolina General Assembly concerning SB 739,[17] SB 740,[18] HB 976,[19] and Legislative and Congressional Redistricting,[20] including all materials from the House Standing Committee on Redistricting,[21] the Senate Standing Committee on Redistricting and Elections,[22] and the Joint Redistricting Committee concerning the aforementioned redistricting plans and the 2021 redistricting cycle.

46. All parties stipulate and agree that any party may cite, discuss, and otherwise rely on as admitted evidence, all transcriptions, audio and/or video recordings of: (1) the committee

---

[17] https://www.ncleg.gov/BillLookUp/2021/S739

[18] https://www.ncleg.gov/BillLookUp/2021/S740

[19] https://www.ncleg.gov/BillLookUp/2021/H976

[20] https://www.ncleg.gov/Redistricting

[21] https://www.ncleg.gov/Committees/CommitteeInfo/HouseStanding/182

[22] https://www.ncleg.gov/Committees/CommitteeInfo/SenateStanding/154

meetings of the House Standing Committee on Redistricting, the Senate Standing Committee on Redistricting and Elections, and the Joint Redistricting Committee, including public hearings hosted by any of those committees concerning the 2021 redistricting process, (2) the House and Senate floor votes concerning SB 739, SB 740, and HB 976, and (3) the publicly available House and Senate map drawing sessions related to SB 739, SB 740, and HB 976.

HISTORICAL ELECTION RESULTS & CENSUS DATA STIPULATIONS

47. All parties stipulate and agree to the accuracy and admissibility of historical election results publicly available on the website of the North Carolina State Board of Elections, including all election results from 2000 to 2020, sorted by precinct, available on the North Carolina State Board of Elections website.[23]

48. All parties stipulate and agree to the accuracy and admissibility of the publicly available Public Law 94-171 redistricting data released by the United States Census Bureau in 2021, including data from the United States Census Bureau's 2020 Census (Public Law 94-171) "Redistricting Data Summary Files" and "TIGER/Line Shapefiles."[24]

[23] https://www.ncsbe.gov/results-data/election-results/historical-election-results-data; https://dl.ncsbe.gov.

[24] https://www.census.gov/data/datasets/2020/dec/2020-census-redistricting-summary-file-dataset.html; https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html; https://www2.census.gov/programs-surveys/decennial/2020/data/01-Redistricting_File--PL_94-171/North_Carolina/

JENNER & BLOCK LLP

Sam Hirsch*
Jessica Ring Amunson*
Kali Bracey*
Zachary C. Schauf*
Karthik P. Reddy*
Urja Mittal*
JENNER & BLOCK LLP
1099 New York Avenue NW, Suite 900
Washington, D.C. 20001
(202) 639-6000
shirsch@jenner.com
zschauf@jenner.com

David Bradford*
JENNER & BLOCK LLP
353 North Clark Street
Chicago, IL 60654
(312) 923-2975
dbradford@jenner.com

* *Admitted pro hac vice*

ROBINSON, BRADSHAW & HINSON, P.A.

/s/ Stephen D. Feldman

Stephen D. Feldman
North Carolina Bar No. 34940
ROBINSON, BRADSHAW & HINSON, P.A.
434 Fayetteville Street, Suite 1600
Raleigh, NC 27601
(919) 239-2600
sfeldman@robinsonbradshaw.com

Adam K. Doerr
North Carolina Bar No. 37807
ROBINSON, BRADSHAW & HINSON, P.A.
101 North Tryon Street, Suite 1900
Charlotte, NC 28246
(704) 377-2536
adoerr@robinsonbradshaw.com

Erik R. Zimmerman
North Carolina Bar No. 50247
ROBINSON, BRADSHAW & HINSON, P.A.
1450 Raleigh Road, Suite 100
Chapel Hill, NC 27517
(919) 328-8800
ezimmerman@robinsonbradshaw.com

Counsel for NCLCV Plaintiffs

PATTERSON HARKAVY LLP

Burton Craige, NC Bar No. 9180
Narendra K. Ghosh, NC Bar No. 37649
Paul E. Smith, NC Bar No. 45014
100 Europa Dr., Suite 420
Chapel Hill, NC 27517
(919) 942-5200
bcraige@pathlaw.com
nghosh@pathlaw.com
psmith@pathlaw.com

Counsel for Harper Plaintiffs

ELIAS LAW GROUP LLP
/s/ Narendra Ghosh

Abha Khanna
1700 Seventh Avenue, Suite 2100
Seattle, Washington 98101
Phone: (206) 656-0177
Facsimile: (206) 656-0180
AKhanna@elias.law

Lalitha D. Madduri
Jacob D. Shelly
Graham W. White
10 G Street NE, Suite 600
Washington, D.C. 20002
Phone: (202) 968-4490
Facsimile: (202) 968-4498
LMadduri@elias.law
JShelly@elias.law
GWhite@elias.law

ARNOLD AND PORTER KAYE SCHOLER LLP

Elisabeth S. Theodore
R. Stanton Jones
Samuel F. Callahan
601 Massachusetts Avenue NW
Washington, DC 20001-3743
(202) 954-5000
elisabeth.theodore@arnoldporter.com

Counsel for Harper Plaintiffs

NORTH CAROLINA
DEPARTMENT OF JUSTICE

/s/ Mary Carla Bab
Mary Carla Babb
Special Deputy Attorney General
N.C. State Bar No. 25713
mcbabb@ncdoj.gov

Terence Steed
Special Deputy Attorney General
N.C. State Bar No. 52809
tsteed@ncdoj.gov

Stephanie Brennan
Special Deputy Attorney General
N.C. State Bar No. 35955
sbrennan@ncdoj.gov

Amar Majmundar
Senior Deputy Attorney General
N.C. State Bar No. 24668
amajmundar@ncdoj.gov

Post Office Box 629
Raleigh, NC 27602
Phone: (919) 716-6900
Fax: (919) 716-6763

Counsel for State Defendants

/s/ Phillip J. Strach

NELSON MULLINS RILEY &
SCARBOROUGH LLP
Phillip J. Strach (NC Bar No. 29456)
phillip.strach@nelsonmullins.com
Thomas A. Farr (NC Bar No. 10871)
tom.farr@nelsonmullins.com
Alyssa M. Riggins (NC Bar No. 52366)
alyssa.riggins@nelsonmullins.com
4140 Parklake Avenue, Suite 200

/s/ Allison J. Riggs
Allison J. Riggs (State Bar No. 40028)
allison@southerncoalition.org
Hilary H. Klein (State Bar No. 53711)
hilaryhklein@scsj.org
Mitchell Brown (State Bar No. 56122)
Mitchellbrown@scsj.org
Katelin Kaiser (State Bar No. 56799)
Katelin@scsj.org
Jeffrey Loperfido (State Bar No. 52939)
jeffloperfido@scsj.org

SOUTHERN COALITION FOR SOCIAL JUSTICE
1415 W. Highway 54, Suite 101
Durham, NC 27707
Telephone: 919-323-3909
Facsimile: 919-323-3942

J. Tom Boer* (D.C. Bar No. 469585;
CA Bar. No. 199563)
tom.boer@hoganlovells.com
Olivia T. Molodanof* (CA Bar No.
328554)
olivia.molodanof@hoganlovells.com
* Admitted *Pro Hac Vice*

HOGAN LOVELLS US LLP
3 Embarcadero Center, Suite 1500
San Francisco, California 94111
Telephone: 415-374-2300
Facsimile: 415-374-2499

Counsel for Plaintiff Common Cause

Raleigh, NC 27612
Telephone: (919) 329-3800

BAKER HOSTETLER LLP
Mark E. Braden* (DC Bar No. 419915)
MBraden@bakerlaw.com
Katherine McKnight* (VA Bar No. 81482)
kmcknight@bakerlaw.com
1050 Connecticut Ave NW, Suite 1100
Washington DC 20036

* Admitted Pro Hac Vice

Counsel for Legislative Defendants