MICHIGAN REDISTRICTING DRAFT MAP ANALYSIS

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EXECUTIVE SUMMARY

Michigan has embarked on an historic redrawing of boundaries for its 13 U.S. House, 38 Senate and 110 House districts. Redistricting was entrusted this year to 13 members of the Michigan Independent Redistricting Commission (MICRC) randomly selected from a pool of qualified applicants.

This report provides a quantitative analysis of the collaborative Draft Proposed maps, as those maps were collaboratively drawn by the MICRC and released on Oct. 11, 2021. For the collaborative maps, the Commission voted to release four congressional maps, three Michigan Senate maps, and three Michigan House maps. These Draft Proposed maps will be subject to a round of public hearings to be conducted around the state from Wednesday, Oct. 20 to Wednesday, Oct. 27.

In this report, the Institute for Public Policy and Social Research at Michigan State University analyzes these 10 collaborative Draft Proposed maps, each bearing a number identifier and the names of trees found in Michigan's forests, orchards and backyards.

This report offers a powerful tool and a guide the Commission and the public can use to compare and evaluate each of the maps to weigh the benefits of adhering closer to some criteria over others, and how maps can change characteristics as they change shape and move toward different metrics. The unique feature is a comparison of the Draft Proposed maps against maps submitted by the public as well as computer-generated maps, enabling an assessment of where MICRC maps stand out.

The report also includes a brief description of answers to survey questions posed to Michigan citizens, and to Michigan policy leaders who work in state politics, about their understanding of the MICRC and likelihood of engaging with the commission. Michigan's citizens seem positive about the MICRC and its goal of preventing gerrymandering and bringing about more fairness in new districts and elections.

This review doesn't evaluate whether a complete map is "good" or "bad;" it proposes a battery of objective quantitative analyses reflecting how each Proposed Draft map performs on each of the seven criteria specified in a modification of the Michigan Constitution in 2018.

The report, based on analysis to date, makes a set of observations due immediate consideration:

- Some maps appear to be incomplete, with a number U.S. Census blocks not assigned to districts, a finding that can be repaired with revision.
- Population deviations from perfect equality may need justification.
- Draft plans pursue an unusual path to compliance with the Voting Rights Act, maximizing districts that are near 40 percent African-American population, but below majority.
- It isn't yet clear whether the MICRC has followed a systematic way to choose among Communities of Interest.
- Most Commission maps show a partisan lean toward Republicans on most measures, but that is likely due to the geographic concentration of Democrats rather than Commission intent. Maps look well within the range of scores for the public- and computer-generated maps, with a few seeming to minimize any partisan lean.

Some maps also await analysis and some measures are not yet available. Please see ippsr.msu.edu/redistricting as analysis is updated. Under MICRC mapping guidelines, a final vote is expected Thursday Dec. 30, 2021. In addition to this initial analysis, IPPSR plans a full report of Michigan's new redistricting initiative in 2022.

INTRODUCTION

As [Michigan's Independent Citizens Redistricting Commission](#) embarked on its history making work, Michigan State University's Institute for Public Policy and Social Research helped provide training and technical assistance to the fledging commission. In all its work, the Institute for Public Policy and Social Research (IPPSR) applies research to pressing public policy issues and builds problem-solving relationships between the academic and policymaking communities. For the Michigan Independent Citizens Redistricting Commission (MICRC) and its staff, IPPSR has played a role in promoting and conducting research on redistricting and related public policy issues, has provided survey research, and produced education and training programs.

In this role, IPPSR worked alongside the [University of Michigan's Center for Local, State and Urban Policy in the Ford School of Public Policy at the University of Michigan (CLOSUP)](#). All work was under the direction of IPPSR Director Dr. Matt Grossmann and CLOSUP Executive Director Tom Ivacko. This work was undertaken with the support of [The Joyce Foundation](#), which invests in evidence-informed public policies and strategies to advance racial equity and economic mobility in the nation's Great Lakes heartland states.

Before the Redistricting Commission began drawing any lines, IPPSR and CLOSUP were involved in orienting the Commission. The first day, on the afternoon of Sept. 17, 2020 the Commission heard about the Basics of Article IV, Section 6 of the Michigan Constitution. That article and section held the constitutional mandate giving the MICRC the exclusive authority to redistrict the state. The discussion included information on process and especially the mapping criteria, the constitution's seven priorities – in order – for proposing and adopting a redistricting plan. As part of that session, the panel presentation brought together Dr. John Chamberlin, professor emeritus of public policy, University of Michigan, and Dr. Jon Eguia, professor of economics, MSU. Dr. Grossmann moderated the session.

The following morning, Ivacko moderated a discussion on redistricting history and the Voting Rights Act. That panel included Ellen Katz, professor of law, University of Michigan Law School, and Justin Levitt, professor of law, Loyola Law School.

Dr. Grossmann moderated a second panel presentation that day on redistricting in Michigan. The panelists were Chris Thomas, former director of the Michigan Bureau of Elections, and John Pirich, veteran elections attorney and faculty member, Michigan State University Law School.

A third session, on Michigan demographics and the U.S. Census, took place just a month later. In that session, the Redistricting Commission heard from Michigan State Demographer Eric Guthrie; Lisa Neidert, retired data archivist from the U of M Population Studies Center and Noah Durst, an MSU assistant professor of urban and regional planning whose expertise focuses on population measures of housing and location. Commissioners heard about Michigan's diversity of people, economic sectors and regional interests, especially as those are measured through the U.S. Census. The goal: to give redistricting commissioners the knowledge needed to identify most likely Michigan locations for public hearings and to understand population dynamics.

The following spring brought a series of four panels outlining and explaining redistricting duties as they relate to the Voting Rights Act, Communities of Interest and Map-Drawing. These duties are essential to complying with laws and constitutional requirements of Michigan's newly enacted redistricting mandates calling for a fairly drawn, citizen-led and transparent process to map boundaries for the state Congressional, House and Senate district lines.

Three experts were scheduled to speak about the Voting Rights Act details and requirements. Those specialists were Leah Aden, deputy director of litigation, NAACP Legal Defense and Educational Fund, Inc.; David J. Becker, executive director and founder, Center for Election Innovation & Research and Michael Li, senior counsel, Brennan Center for Justice. IPPSR Director Grossmann moderated.

A second spring session featured a panel of experts who described and defined Communities of Interest for the MICRC work. Those specialists were Mariana C. Martine, Director of Civic Engagement Initiatives, Michigan Nonprofit Association; Susan Smith, Vice President – Advocacy, League of Women Voters of Michigan. Ivacko, CLOSUP executive director, moderated.

In a highly interactive presentation, IPPSR then brought together software expertise, a demographer and political scientists to lead the discussion of how maps would ultimately be drawn and the challenges in outlining their shapes and the people who would vote within them. The first session presented tips about understanding trade-offs among the criteria and difficulties in the mapping process, led by Grossmann and Guthrie. Members of the Redistricting Commission were then invited to begin their own map drawing practice of the State of Ohio and receive feedback from experts on their practice maps.

IPPSR and CLOSUP consulted with experts to review the commissioners' maps and to conclude the exercise with a process of collectively practicing map-drawing. Those experts were Dr. Moon Duchin, professor of mathematics, Tufts University; Dr. Ashton Shortridge, professor, Department of Geography, Environment and Spatial Sciences, MSU; Dr. Corwin Smidt, interim director, Department of Political Science, MSU; Chamberlin, of the University of Michigan; Ivacko of CLOSUP; Dr. Eguia. State Demographer Guthrie and Dr. Grossmann of IPPSR led the collective practice mapping process of Ohio congressional districts.

In the fall of 2021, IPPSR, with CLOSUP, helped produce three online webinars sharing resources on redistricting and communities of interest (COIs). Recordings of these events, open to the public, illuminated the importance of public input, data collection and aggregation and how, even as preliminary redistricting commission maps were made available for public hearings, members of the public were still invited and empowered to make their views known.

From the start, IPPSR helped to prepare and compile -- in conjunction with the Michigan Department of State, which oversees elections and redistricting within Michigan, CLOSUP and the Princeton Gerrymandering Project, -- a set of publicly available Commissioner Orientation and Resource Materials. These materials outlined an initial agenda for the commission's convening, constitutional language setting forth required redistricting criteria, hands-on mapping resources, draft timelines for meetings and decision-making and a glossary of terms.

In 2021, Michigan State University's Institute for Public Policy and Social Research was the recipient of a two-year, $250,000 grant extended from The Joyce Foundation of Chicago.

The grant engaged IPPSR to provide training and technical assistance to the Michigan Independent Citizens Redistricting Commission. IPPSR was also to evaluate the state's first redistricting process under the MICRC.

Through the life of the two-year grant, IPPSR is working with the University of Michigan's Center for Local, State, and Urban Policy, sharing resources, conducting educational programming and evaluating the redistricting process. This report is the preliminary version of the evaluation. In addition to updating this report, IPPSR and CLOSUP will provide a final report on the full

redistricting process in 2022. This report is designed to provide information and materials that the Commission and the public can still use now before voting on final maps.

IPPSR is engaging with Dr. Eguia, lead author of this report, to conduct the evaluation of preliminary maps.

We have also used materials made public by Dr. Duchin's Metric Geometry and Gerrymandering Group (MGGG Redistricting Lab) at Tisch College of Tufts University, which include many metrics and scores for the MICRC plans, the plans submitted by the public, and randomly generated alternative plans.

IPPSR also provided race-of-candidate data from Dr. Eric Gonzales Juenke for use in the Commission's Voting Rights Act analysis by Dr. Lisa Handley, president of Frontier International Consulting, an election consulting firm.

Under the US Constitution, Congressional and Legislative districts must be redrawn every 10 years upon completion of a new U.S. Census. The Voters Not Politicians amendment approved by Michigan voters in 2018 empowered a commission randomly selected from a pool of pre-qualified applicants to draw the boundaries outlining the state's U.S House, state Senate and House of Representative districts.

The constitutionally revised task that had traditionally been overseen by Michigan's Legislature and governor instead moved into the hands of the MICRC – constituted of four people aligned with the Democratic Party, four identified as Republicans and five members who claimed allegiance to no specific party.

This effort was complicated by the COVID pandemic and associated delay in receiving U.S. Census data. This redistricting will be written about, evaluated, tested, retested and challenged in the coming months and years – potentially decades – as Michigan and its populace, policy and politics follow this new path to drawing the boundaries from which voters will cast their ballots. Our full evaluation of the Commission and its final maps will come in the summer of 2022.

We are indebted to The Joyce Foundation, to postdoctoral fellow Christian Cox at the Jackson Center for Global Affairs at Yale University, to IPPSR Director Matt Grossmann and CLOSUP Director Tom Ivacko, to Dr. Duchin and her team at MGGG, to MICRC Director Suann Hammersmith and staff, and to all those at Michigan State University and the University of Michigan who contributed to this informative and educational effort, especially Cindy Kyle, Bonnie, Roberts, Nick Pigeon, Julian Trevino, Natalie Harmon and Lia Bergin.

LEAD AUTHOR

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This report provides a quantitative analysis of the collaborative Proposed Draft maps for Michigan congressional districts, for Michigan Senate districts, and for Michigan House districts, released to the public by the Michigan Independent Citizen Redistricting Commission consideration during a second round of public hearings to be conducted from Oct. 20, 2021 to Oct. 27, 2021.

On October 11, the Commission voted to release four congressional maps, three Michigan Senate maps, and three Michigan House maps, all drawn collaboratively by commissioners. We analyze these 10 collaborative Proposed Draft maps. The Commission assigned each plan a name, and a codename based on a tree native to Michigan. We refer to the maps by these codenames. Here is a table with the maps and their names, obtained from the Commission's website at https://www.michigan.gov/micrc/.

TABLE. List of Collaborative Proposed Maps		
Type of District	**Codename**	**Plan Number**
State Senate	Elm	199
State Senate	Cherry	220
State Senate	Spruce	226
State House	Peach	228
State House	Oak	229
State House	Pine	227
Congressional	Apple	201
Congressional	Birch	230
Congressional	Maple	219
Congressional	Juniper	218

Each Commissioner also had an opportunity to submit an individually drawn map of each type (Congressional, state House, state Senate) of district, but we do not analyze the individual maps here. To inform the public in a timely manner, this first report on the Proposed Draft maps contains the analysis that was available on time for the first hearing of the second round of public hearings. We will subsequently complement this report with additional analyses. The report is thus intended as a "living document", updated as more content becomes available. The latest version of this report is available at: ippsr.msu.edu/redistricting

A complete redistricting plan must divide the entire area of the state into districts, so that each point in the geography of the state is in one — and only one — district in each of three maps: districts for the U.S. Congress, for the state House, and for the state Senate. The Michigan Constitution, Art IV, § 6(13) states that in proposing and adopting each redistricting plan, the Commission shall abide by *seven criteria*, ranked in order of priority.

We first check that each proposed map is a complete redistricting map that assigns each place of residency to exactly one district. We then assess each of the collaborative Proposed Draft maps on the basis of these seven criteria. We assess the congressional district maps in Part III; the Senate district maps in Part IV; and the House district maps in Part V. For each type of map, and for each criterion, we describe quantitative measures of performance. Then, we report how each map performs according to each of these measures. Our analysis is based on the map boundaries reported on the Commission website, though the Commission is using different software so some variations are possible.

For comparison, we report the distribution of scores across all maps in what we term the "Public Ensemble," maps submitted by the public on the MICRC online portal, and what we term the "Computational Ensemble," a set of 100,000 computer-generated maps. For each type of map, and for each criterion, we describe quantitative measures of performance on the basis of this criterion. The Commission has reviewed measures of its maps' performance, but it has compared them against a theoretical baseline, rather than the range of maps submitted by the public and a range of computer-generated maps.

The scores on some of our measures are easy to interpret directly. For instance, if we have a measure of "contiguity" (Criteria Two) that assigns a value "1" if each district is connected in one piece, and a value of "0" if it is not. If a proposed map scores a "1" on this measure, then we know that all the districts on this map are connected. Other measures follow more complicated mathematical formulas, and any given score is harder to interpret in isolation. Comparing the performance of the MICRC draft maps to both the Public Ensemble and the Computational Ensemble makes scores easier to interpret.

For each of the three types of districts (Congressional, Michigan Senate, and Michigan House), the Public Ensemble is the collection of all complete and sufficiently close to valid maps of districts submitted by the public through the MICRC's submission portal. at https://www.michigan-mapping.org by Oct. 1, 2021.[1] The Public Ensemble of Congressional district maps contains 112 maps; the Public Ensemble of Senate maps contains seven maps. Unfortunately, all Michigan House plans submitted by the public have a population difference across districts greater than 25%, so we are not able to include any to construct the Public Ensemble for the state House. In other words, no citizen succeeded in drawing 110 Michigan House districts of near equal population (partially because many maps were drawn before the new Census data was available).

For each of three types of districts, the Computational Ensemble contains 100,000 maps of districts of this type, created by the MGGG Redistricting Lab using the Recombination (ReCom) algorithm. All the computationally generated maps are within 1% of the ideal district population, and attempt to respect county boundaries, but are not designed to follow any other criteria. This algorithm starts with a starting map, also known as a "seed" map. From that start, the algorithm constructs new maps following a random path (what we know in statistics as a "Markov Chain Monte Carlo" or "MCMC") that at each step transforms a given map into the next map. At each step of this path, the algorithm randomly selects two adjacent districts in the current map, it

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[1] MGGG deemed a map sufficiently close to valid if it leaves unassigned no more than five Census' Voting Tabulation Districts (all must be assigned); the maximum population deviation from the ideal equal population across its districts is below 5% (it must be much lower than that), and if it violates contiguity, it is only in a minor way.

merges them, and then it re-splits the merger into two new districts, thus generating a new map.[2] At each step, the change from the prior map to the next one is therefore small.

In this way, our report offers a powerful tool and a guide that the public can use to compare and evaluate each of the maps so they can weigh the benefits of adhering closer to some criteria over others, and how maps can change characteristics as they change shape and move toward different metrics.

We stress that we do not evaluate whether a complete map is "good" or "bad," nor do we offer an opinion as to whether it is legal or illegal under the Michigan Constitution. We leave it up to each Michigan citizen to decide how each map meets the criteria, and up to jurists and courts to determine if the maps meet legal tests.

What we hope to offer is a battery of objective quantitative analyses reflecting how each Proposed Draft map performs on each of the seven criteria specified in the Michigan Constitution.

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[2] https://mggg.org/uploads/ReCom.pdf

PART II. THE SEVEN CONSTITUTIONAL CRITERIA

Article IV §6 (13) of the Michigan Constitution instructs that *"The commission shall abide by the following criteria in proposing and adopting each plan, in order of priority:*

Criterion A. Districts shall be of equal population as mandated by the United States constitution, and shall comply with the [Voting Rights Act] and other federal laws.

Criterion B. Districts shall be geographically contiguous. Island areas are considered to be contiguous by land to the county of which they are a part.

Criterion C. Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests. Communities of interest do not include relationships with political parties, incumbents, or political candidates.

Criterion D. Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness.

Criterion E. Districts shall not favor or disfavor an incumbent elected official or a candidate.

Criterion F. Districts shall reflect consideration of county, city, and township boundaries.

Criterion G. Districts shall be reasonably compact."[3]

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[3]
http://www.legislature.mi.gov/(S(4kdli1sqztuxeeo1svfgodhz))/mileg.aspx?page=getObject&objectName=mcl-Article-IV-6

PART III. ANALYSIS OF PROPOSED DRAFT MAPS FOR MICHIGAN'S CONGRESSIONAL DISTRICTS

III.1. THE PROPOSED DRAFT CONGRESSIONAL DISTRICT MAPS

On October 11, the MICRC approved the following collaborative Proposed Draft maps for U.S. Congressional districts, for consideration in the Second Round of Public Hearings (Oct 20th – Oct 27, 2021): [4]

-**Plan "Apple", name "10-05-21 v1 CD DW"** (map number #201), on a vote of 13-0.
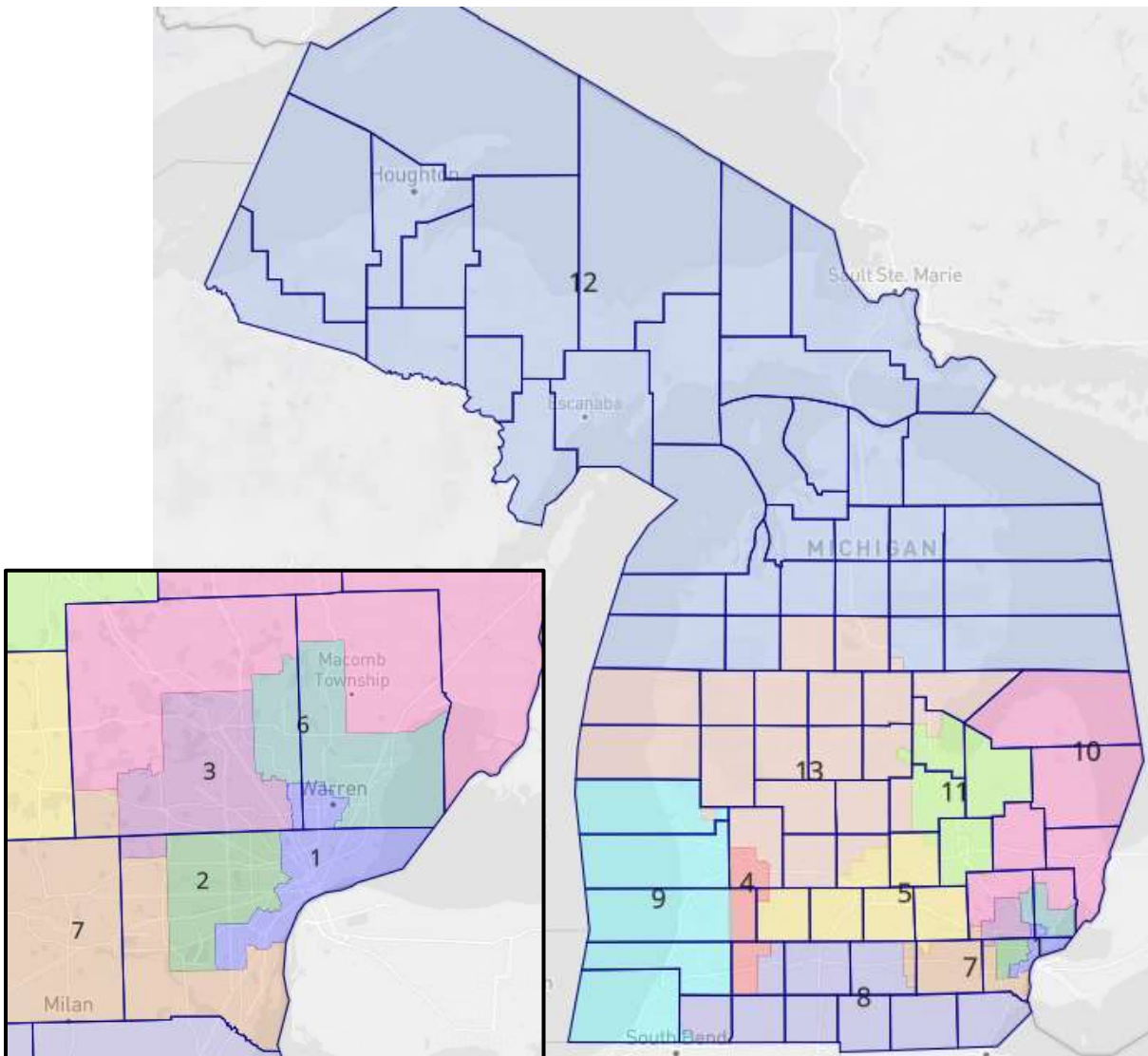

Plan Apple

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[4] These maps are available for download here:
https://michigan.mydistricting.com/legdistricting/michigan/comment_links

-**Plan "Juniper", name "10-07-21 v1 CD AE"** (map number #218), on a vote of 13-0.
Note that the Juniper map appears to <u>not be a valid redistricting plan</u>, as it fails to assign a district to all the areas of Michigan. A triangle contained in Census Block 2000 in Ray Township (Macomb Co.) is unassigned to any district. This triangle is delimited by 29 Mile Rd, Indian Trail, and the line divider between Ray Township and Lenox Township, and contains 14 residents.[5]
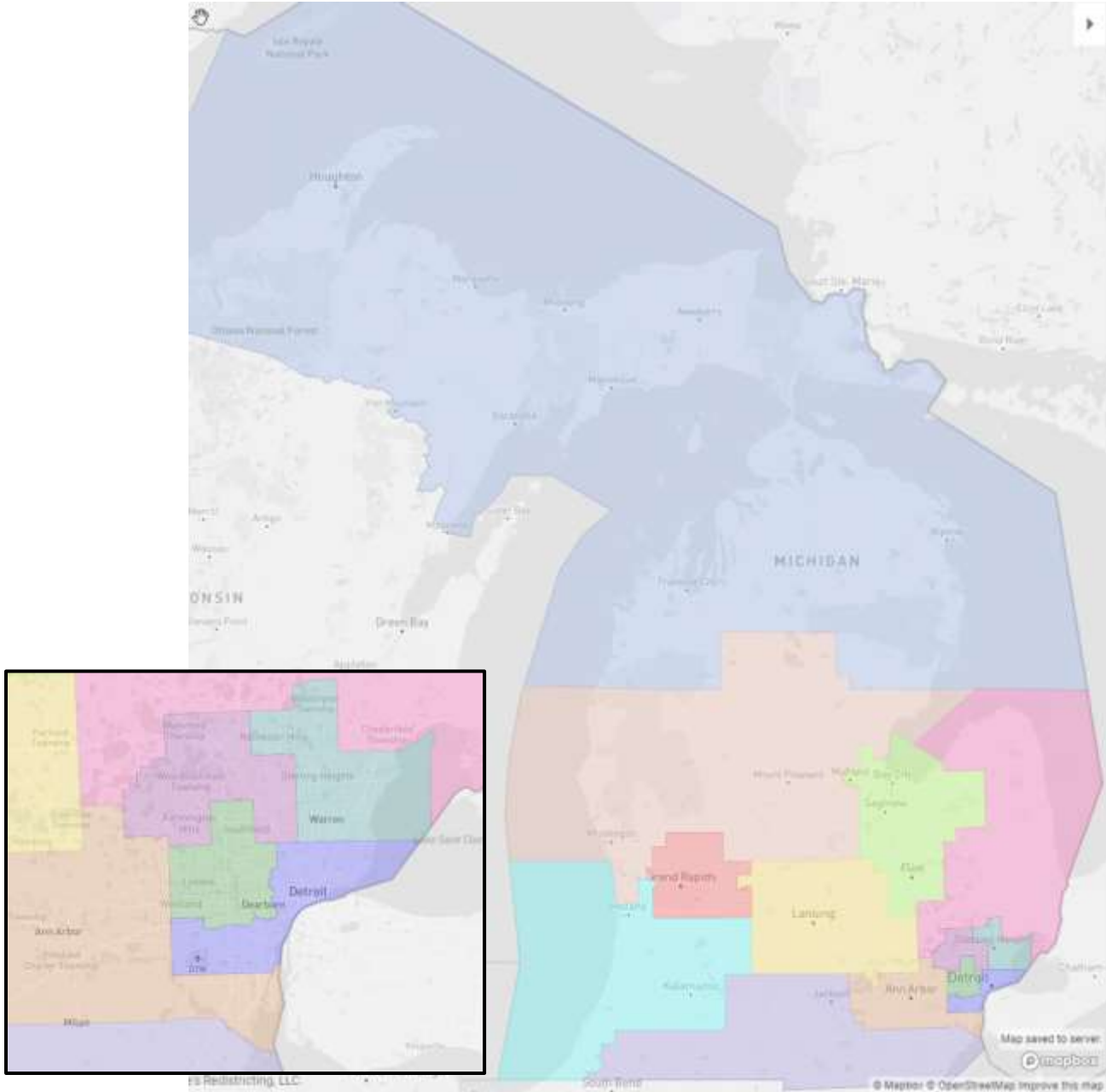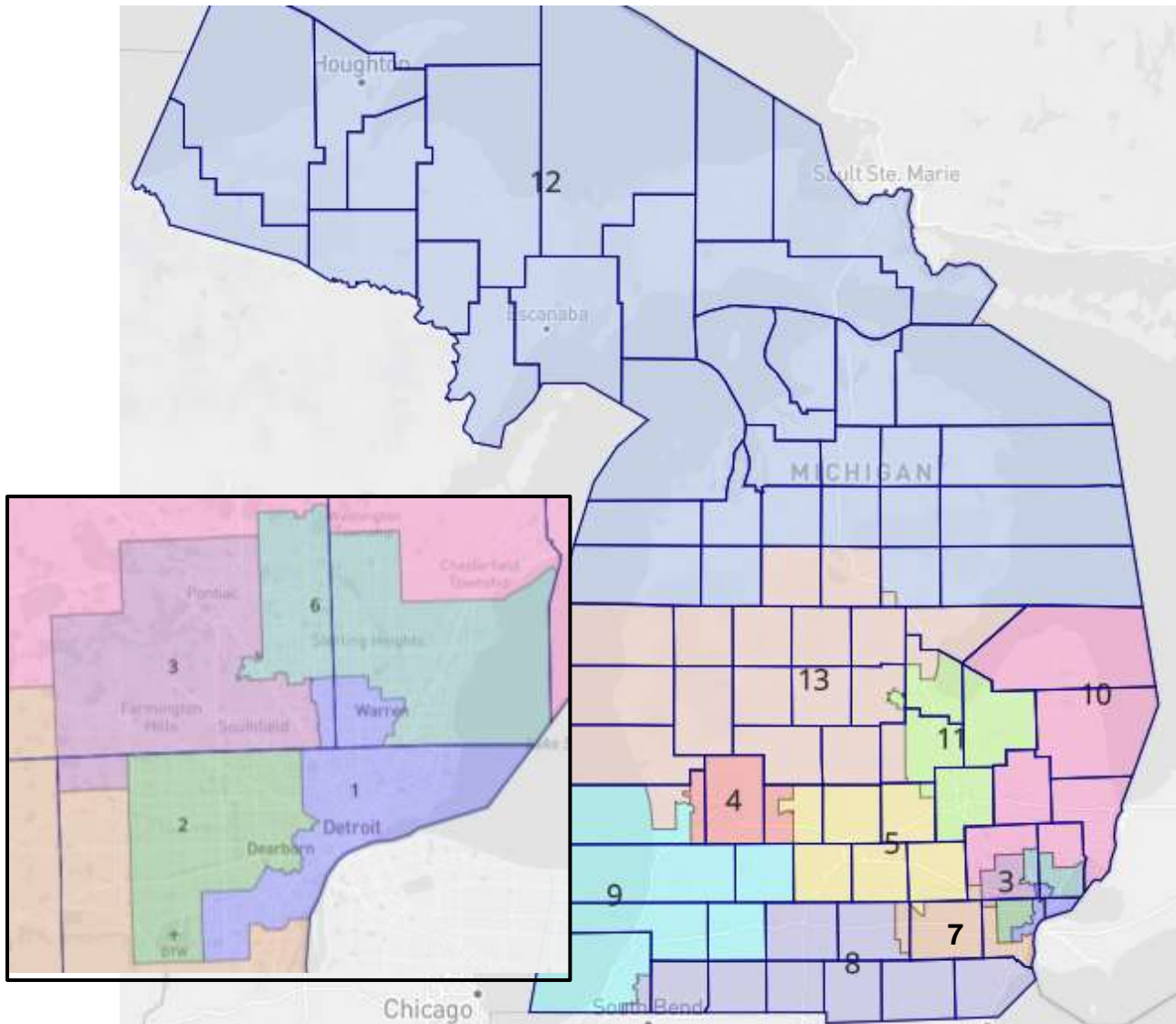

Plan Juniper (incomplete)

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[5] See grid map 7 in Census map
https://www2.census.gov/geo/maps/DC2020/DC20BLK/st26_mi/county/c26099_macomb/DC20BLK_C26099.pdf

-**Plan "Maple", name "10-07-21 v1 CD DC"** (map number #219), on a vote of 13-0.

Plan Maple

-**Plan "Birch", name "10-08-21 v1 CD RAS"** (map number #230), on a vote of 12-1.

Note that the Birch map appears to <u>not be a valid redistricting plan</u>, as it fails to assign a district to all the areas of Michigan. Plan Birch fails to assign any district to census blocks 1010 and 1014 in census track 1724 in Oak Park (Oakland County.) These blocks contain 25 inhabitants. These blocks must be assigned to a district.[6]
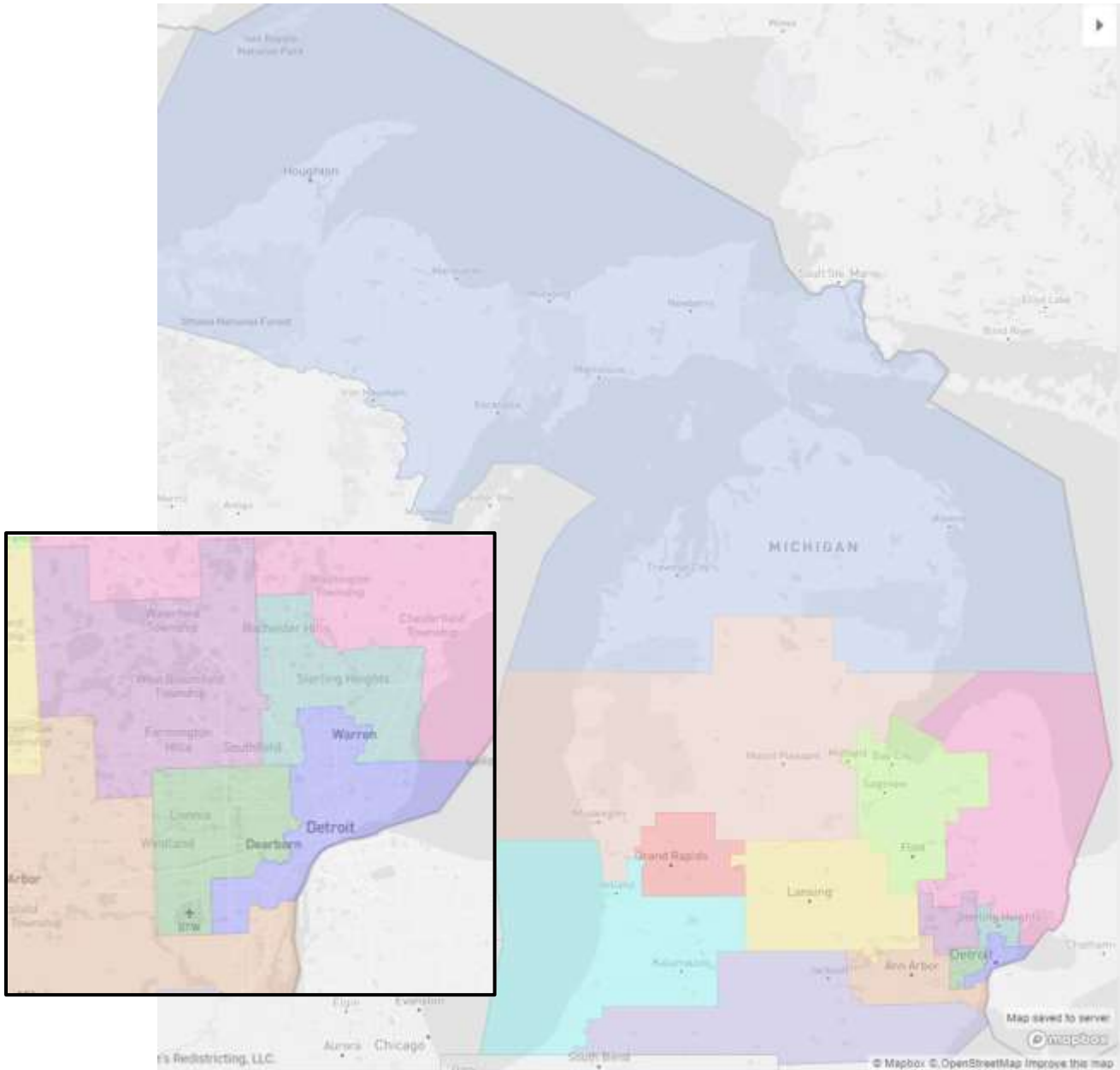
Plan Birch (incomplete)

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[6] See grid map 35 and Inset J on Census map
https://www2.census.gov/geo/maps/DC2020/DC20BLK/st26_mi/county/c26125_oakland/DC20BLK_C261 25.pdf

III.2. MEASURING PERFORMANCE ON EACH CRITERIA

CRITERION A: POPULATION BALANCE AND VOTING RIGHTS ACT

"Districts shall be of equal population as mandated by the United States constitution, and shall comply with the voting rights act and other federal laws."

Understanding the Criterion.
This criterion has three parts. The first is that districts shall be of equal population. The second is that they shall comply with the Voting Rights Act. And the third is an open-ended guarantee for future redistricting cycles that complying with criteria B through F will always be secondary to complying with any future federal law.

With regard to equal population, the population is the total number of inhabitants, as measured according to the most recent US Census, in this case the 2020 US Census. The Michigan population according to the 2020 US Census is 10,077,331 inhabitants. Michigan has 13 Congressional districts. So, the ideally equal population is 775,179 inhabitants per district. The United States Supreme Court has ruled that any deviation from exact equal population must be "necessary to achieve some legitimate state objective," but "small differences in the population of congressional districts" are acceptable if these differences are required to satisfy a state's redistricting criteria. [7] In practice, The Court has accepted a deviation as large as 0.79% of difference between the most and least populous district.[8] Therefore, any deviation from perfect population equality must be required to better satisfy one of the criteria A-F, and such deviation must be small, probably not much larger than 0.79%. If there is any substantial deviation from population equality, supporters of one party should not be systematically placed in larger districts.[9]

With regard to the Voting Rights Act, its Section 2 as amended by Congress, currently prohibits enacting electoral maps that have "*the result of denying a racial or language minority an equal opportunity to participate in the political process.*"[10]

The "*equal opportunity to participate*" clause includes an equal opportunity to elect candidates of their choice. It does not require that, nor is it necessarily satisfied if, members of the relevant minority are themselves elected in any proportion. For a district to provide to a minority an opportunity to elect its preferred candidate requires that if the minority overwhelmingly votes for a candidate, then this candidate wins both the party primary and the general election, given the standard voting patterns of voters not in this minority. Any such district is a "district of opportunity" for the relevant minority. This opportunity to elect candidates of their choice does not require –but it is guaranteed— if the relevant minority is a majority of the population in the district (a so called "majority-minority" districts).

Measures of performance on Criterion A.

A1**. Measure of population inequality.**

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[7] Karcher v. Daggett, 462 U.S. 740-741 (1983)
[8] Tennant v. Jefferson County 567 U.S. 758 (2012)
[9] Cox v. Larios, 542 U.S. 947
[10] https://www.justice.gov/crt/section-2-voting-rights-act#sec2

We compute the difference between the most and least populous district, using the formula:

$$\frac{Population\ of\ most\ populous\ district}{Population\ of\ least\ populous\ district} - 1,$$

in percentage points.

For convenience, we also report the largest deviation to the ideal population size of a district, namely,

$$\frac{Population\ of\ most\ populous\ district}{775,179} - 1,$$

again, in percentage points.

A2. **Number of Districts of Opportunity**.
The ideal way to quantify a measure of compliance with the Voting Rights Act is to use past election results by race and precinct, in both primary and general elections, to estimate how many districts of opportunity for minorities there are there in a new redistricting plan.

To determine whether a new district is a district of opportunity for a given minority, we need to know which candidate the minority preferred in each past election under consideration, and whether or not the candidate preferred by the minority won most votes in the primary and in the general in this district.

We first need to determine which candidate is preferred by the minority under consideration. Because voting is private, this is not a given. Rather, we infer it from the difference in voting patterns in precincts with a large share of minority adult population, compared to precincts with a small such share. Popular methods to estimate this minority vote are the Ecological Inference methods proposed by Gary King, and other ecological regression method. [11] While the precise statistical methods vary, the idea is always that if Candidate A's vote share grows with the share of minority voting age population, we can infer that minority voters for Candidate A more than non-minority ones, and under some assumptions, we can quantify how much more.

Having established minorities' preferences, we could then check whether these candidates won the most votes in the proposed districts to determine how many districts of opportunity exist in the proposed redistricting plan. We can then compare this number to the proportion of minority population. For instance, the "Black Alone" population is 13.7% of the Michigan population, a percentage that corresponds to approximately two congressional districts. We can also compare it to the number of opportunity districts in the previous redistricting plan, which is again two districts. Further, the U.S. Supreme Court has ruled that a pre-condition for the VRA to apply to any given minority is that this minority is *"sufficiently large and geographically compact to constitute a majority in a single-member district."*[12] We can then find how many such geographically independent minority groups we can construct in Michigan, and we can estimate whether each of these minority groups lives in a district of opportunity.

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[11] King, Gary, Martin A. Tanner, and Ori Rosen, eds. *Ecological inference: New methodological strategies.* Cambridge University Press, 2004.
[12] Thornburg v. Gingles, 478 U.S. 30.

Unfortunately, the data for this preferred analysis is insufficiently available. In particular, there is no centralized repository of primary election results by precinct, precluding the preferred analysis. That means the Commission can estimate how often a minority population has succeeded in having its preferred candidate win general elections, but is severely limited in assessing whether a minority party would have succeeded in nominating its preferred candidate in a contested primary election. The 2018 Democratic primary for Governor included two candidates from the Detroit area against the eventual winner; group voting determinants in this primary may have had idiosyncratic determinants that would not match racial group preferences in congressional primaries.

Nonetheless, following the Commission's intent, we pursue a simpler analysis that bypasses the need for the unavailable data by race and precinct. We refer to "determining if a redistricting plan complies with the Voting Rights Act" by Dr. Handley, presented to the MICRC. Based on an analysis of four counties (Wayne, Oakland, Genesee, and Saginaw) and on only one election with a primary on the Democratic side (the 2018 gubernatorial race), plus an additional 12 general elections with no primary on the Democratic side, she estimates that any district that is at least 40% Black would be likely to elect the Black-preferred candidate, and most districts having a population at least 35% Black would as well. This analysis was based on Dr. Handley's finding that there is significant shared support for the same candidates among black and non-black voters in many of the Detroit area precincts. This is undoubtedly true in general elections, but there may be insufficient data to know how true it is in primary elections.

In a simpler analysis that bypasses the need for the unavailable data by race and precinct, we can use Dr. Handley's estimates, and simply compute the number of districts in the proposed plan that are at least 35% or at least 40% Black. If Dr. Handley's estimates are correct, any 40% Black district is a district of opportunity and will elect candidates preferred by the Black minority. We report these measures:

-Number of districts with >50% of their voting age population identifying as Black.

-Number of districts with >40% of their voting age population identifying as Black.

-Number of districts with >35% of their voting age population identifying as Black.

We compare these measures to the number of districts (two) proportional to the Black population in the state, and to the number of districts with these percentages of Black voting age population in the previous congressional districts plan.

We do not find a sufficient geographic concentration of Hispanic or Latino, or other minorities, in any county, to constitute a majority in a geographically compact district.

The data for these measures are from the 2020 US Census.

Results
We present the results of Population Equality in the following table. Each row lists a redistricting plan for Michigan Senate districts. The first column reports difference between the most and the least populated district. The second column reports the maximum deviation from the ideal district population.

TABLE 1. *Population Equality in Congressional maps.*		
	Pop. difference	**Max. deviation**
	%	%
Plan Apple	0.12%	0.07%
Plan Juniper	0.20%	0.12%
Plan Maple	0.28%	0.17%
Plan Birch	0.27%	0.15%

Note that all these population deviations are small; they are less than half the deviation that the U.S. Supreme Court has deemed admissible if necessary to pursue appropriate state goals. But such small deviations require justification. If any of these plans were adopted, the Commission should explain why these small population differences were necessary to better comply with other criteria in the state Constitution, such as, for instance, to preserve whole precincts in order to evaluate VRA claims more accurately (Criterion A), or to preserve Communities of Interest (Criterion C).

We report the number of districts in which more than 50%, more than 40%, and more than 35% of the Voting Age Population (VAP) identifies as "Black" or "African-American" (alone), as computed by the MGGG Lab for this report, in the following table. These numbers serve as proxy for the number of Black-minority districts of opportunity. As comparison benchmarks, we list the numbers for the Congressional map in place in the 2012-2021 redistricting cycle, and the number that would be proportional to the share (13.7%) of the state population that identifies as "Black."

TABLE 2. *Black minority districts of opportunity in congressional draft proposed maps.*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Apple	0	2	2
Plan Juniper	0	2	2
Plan Maple	0	2	2
Plan Birch	0	2	2
2012-2021 Official Plan	2	2	2
Proportional to Pop.	2		

The most striking result is that neither of the two majority-minority districts in the previous plans survives in any of the four proposed plans. The following graph shows the Black share of the Voting Age Population in each district. Districts are ordered from lowest to highest Black share (that is, the labels in the horizontal axis are not the district number in the Plan; rather, they should be interpreted as lowest Black VAP share (1), 2nd lowest Black VAP share (2), all the way to the district with the highest Black VAP share (13). The colored dots represent each map. The boxes represent the typical Black VAP shares in maps in the Computational Ensemble, and the arms stretching out of the boxes represent the Black VAP share at the borderline extreme map such that only 2.5% of maps have shares above or below the range covered by the arms.
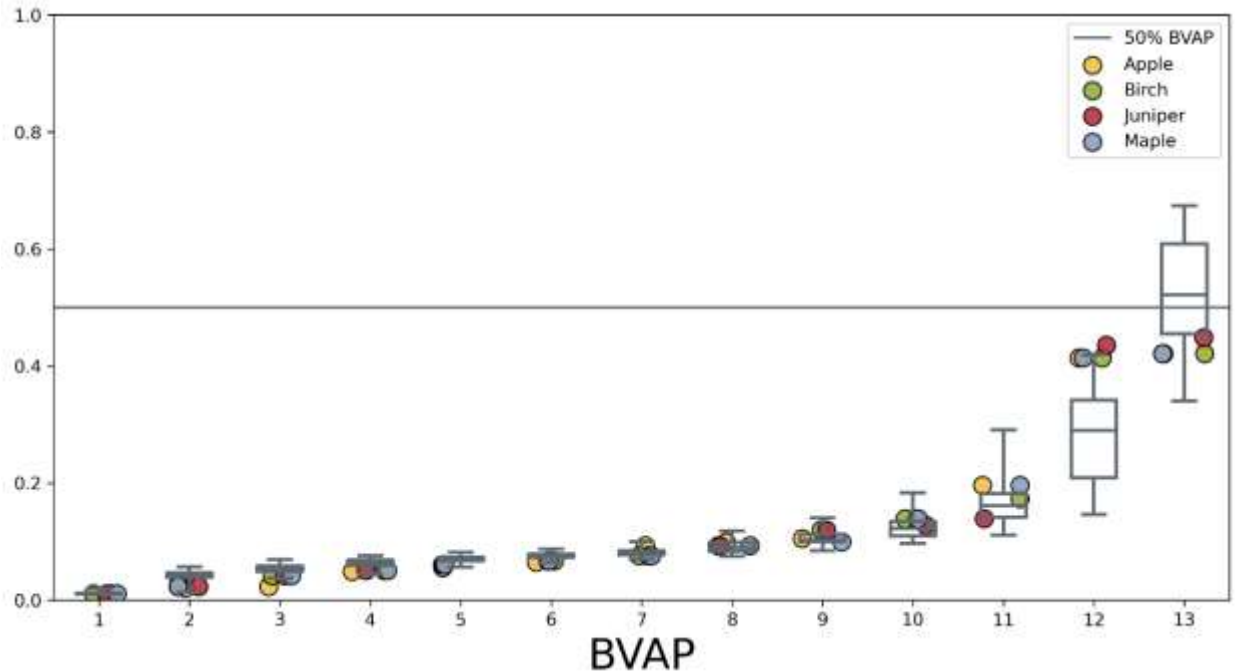
Figure 1. Distribution of Black VAP by Congressional District

As we can see, the four congressional plans are unusual, but not extremely so, in that they take what in most maps are a pair of districts — in and around Metro Detroit — with Black VAP shares of about 55% and 30%, and reconfigure them into two districts, both with slightly over 40% of Black VAP. Keep in mind that the computer-generated maps are just drawing lots of different districts that would maintain equal population and are not designed to maximize Black representation or comply with the VRA.

CRITERION B: CONTIGUITY

"Districts shall be geographically contiguous. Island areas are considered to be contiguous by land to the county of which they are a part."

Understanding the Criterion.
Contiguity means that a district is all connected in a single piece.

Two issues arise. The first is about islands. Islands are physically disconnected into a separate piece, separated from the mainland by water. The criterion says that islands are to be imagined to be physically attached to the county of which they are a part. If the county of which a given island is a part of is split into two districts is the island interpreted to be contiguous to the nearest point of mainland in the county? Or are commissioners free to imagine the island attached to any part of the county of their choosing? For example, Mackinaw Island is to the Southeast of Mackinaw County. Suppose a map assigned the island to a district that took only the westernmost part of Mackinaw County. Would that satisfy "contiguity"? It would not if we imagine the physical attachment to land to be at the nearest point, i.e. by St. Ignace.

The second issue is about what constitutes contiguity. A laxer definition, so called "queen contiguity" allows for contiguity only at a single point, like the diagonal pieces of a chess board that queen, king and bishop chess pieces can transit but other pieces cannot. A stricter definition is "rook contiguity", which requires that the connection between pieces be everywhere by more than a single point. For instance, Van Buren County and St. Joseph County satisfy queen contiguity, as their corners touch upon a single point, but they do not satisfy rook contiguity.

B1. **Measure of Contiguity**.
We report a binary "Yes" or "No" for whether a plan satisfies the stricter definition of contiguity, satisfying rook contiguity with islands attached to the land at the nearest point in the county of which they are a part of.

Results.
All four draft proposed congressional maps satisfy contiguity.

TABLE 3. *Contiguity*.	
	Are all districts contiguous?
Plan Apple	Yes
Plan Juniper	Yes
Plan Maple	Yes
Plan Birch	Yes

CRITERION C: COMMUNITIES OF INTEREST

"*Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests. Communities of interest do not include relationships with political parties, incumbents, or political candidates.*"

Understanding the Criterion.
The Brennan Center for Justice defines communities of interest as "*groups of individuals who are likely to have similar legislative concerns, and who might therefore benefit from cohesive representation in the legislature.*"[13] The goal is to keep such communities of citizens with common legislative concerns together in the same district, so that they can better press their common concern to their representatives.

The difficulty is to identify which geographic areas represent one such community of interest. The language of the criterion gives a suggestion: "*populations that share cultural or historical characteristics or economic interests*", but this list is non-exclusive, and these common characteristics or interests are difficult to ascertain.

The Brennan Center for Justice suggests two means to identify communities of interest.[14] One is top-down, in which mapmakers can use quantitative data to find geographic areas of the state with aligned indicators of shared cultural, historical or economic characteristics. A second approach is bottom-up, in which mapmakers, instead of trying to pro-actively find communities in the data, can sit back and allow the public report the communities of interest that mapmakers should consider.

The Michigan Independent Citizen Redistricting Commission in 2021 has followed this second option, a bottom-up approach, inviting the public to submit maps and descriptions of communities of interest for the Commission to consider. We can distinguish two ways in which communities of interest could be revealed from public input.

One is for communities to be self-declared: every geographic area has some elected boards that represents it (neighborhood associations; city, town or county councils; county commissions, etc.). Any such organization could declare that the community it represents is a community of interest with shared cultural, historical and economic interests. Any community of interest that cuts across several of these units of democratic representation (for instance, a community of interest comprising parts of two adjacent townships) could be self-declared by a proclamation made jointly by representatives of units of democratic representation that together cover the entire community.

A second mode of public input allows individual members of the public to submit their conceived community of interest, without requiring democratic consent from the rest of the conceived community to be grouped in this manner. A stricter version of this form of individual submissions

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[13] "Communities of Interest." *Brennan Center for Justice* report, November 2010. Retrieved from https://www.brennancenter.org/sites/default/files/analysis/6%20Communities%20of%20Interest.pdf on Sept. 2021.
[14] Yurij Rudenski and Annie Lo. "Creating strong rules for drawing maps." *Brennan Center for Justice* report, last updated January 29, 2020.

requires the individual to be a member of the community, so that submissions amount to "*This is my community and we should be together*" A laxer forms waives this requirement, allowing submissions of the kind "*that is their community and they should be together.*"

The Michigan Independent Citizen Redistricting Commission allowed for the laxer form of public input, encouraging any form of public input on communities of interest, including through submissions by individual citizens about communities that do not include the individual making the submission.

The public responded, uploading —as of October 13, 2021— 1,225 Community of Interest (COI) submissions through the Commission's portal.

Such broad collection of public submissions poses challenges for rigorous quantitative analysis. The submissions vary in their nature, from the whimsical (a combination of dislocated precincts whose geography spells out the word "Hello"), to those more thoughtful; some explaining in detail the common interests that bind the community together, while others lacking such explanation. And while undoubtedly many of the public submissions were drawn in a good-faith to communicate a true community of interest to commissioners, it is impossible to rule out that some were calculated attempts to influence commissioners for partisan gain.

We also note that some submissions were as large as congressional districts and may have been more designed as full-district proposals rather than communities to be kept together within larger districts. Some citizens used this criterion as an invitation to describe more broadly what kinds of people and geographic areas they wanted to see in their districts and what kinds of people and areas they wanted to see out of their districts. Commissioners sometimes referred to these public comments, stating that one area wanted to be with another or did not want to be with another without identifying a particular community of interest. This criterion is not a general attempt to maximize district homogeneity, but to respect communities that can be contained within districts.

It would therefore be somewhat misleading to treat all individual public submissions equally, as if they all represent equally true and valid communities of interest. It would be more informative to conduct a qualitative analysis, sifting through each of the submissions to ascertain which of them constitute a veritable community of interest with a valid explanation. If we could, without controversy, separate the submissions that truly reflect communities of interests, from ones that do not, we could then consider the subset of submissions that do represent communities of interest, and we could quantify how many of these had been kept together in the Commission's maps.

Alas, we cannot easily evaluate whether individual submissions are valid or not. We are left then with a limited quantitative analysis of the pool of submissions. But evaluating an aggregate measure of communities enables less responsiveness to any one submission or type of submission.

C1. **Measure of Respect for Communities of Interest**.
The MGGG Redistricting Lab and Open-Maps Coalition have released a report on "Communities of Interest Clusters for Michigan."[15] This report identifies 34 communities of interest clusters that were identified through aggregation from all Community of Interests submissions by the public up

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[15] We follow version 2.0 of this report, dated September 13, 2021.

to September 1, 2021. A "cluster" is a geographic area in which several individual submissions overlap. The choice of how to organize the hundreds of submissions into a smaller number of clusters presents a trade-off: we can have either more clusters, each of them backed by fewer individual submissions; or fewer clusters, each of them backed by more individual submissions. In settling for 34 clusters, the MGGG and Open-Maps report aimed to strike a balance between having enough testimony of support for each cluster and having clusters that are small enough to demonstrate tightly connected themes in the submissions supporting each of them.

At the website districtr.org/Michigan, viewers can observe the 34 clusters, and the individual COI submissions supporting each of them. After uploading or opening a new district map of Michigan, under the tab "communities," viewers can toggle each of the clusters "on" or "off" to superimpose its boundaries on the Michigan district map, so as to visually observe the overlap with the map's districts.

Respect for communities of interest should be assessed holistically, taking into account not just the number or share of COI submissions that an individual map respects, but also the strength of the arguments in support of each individual submission. We can report the number of clusters that are split and that are mostly contained within a district, together with the population and demographics of each cluster. We use a cut off of whether a COI cluster that is between 0 and 100 percent of a district size has two-thirds of its residents contained within a district.

Results
The quantitative analysis on COI cluster splits is underway by the MGGG Lab and is not yet available.

CRITERION D: PARTISAN FAIRNESS

"*Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness.*"

Understanding the Criterion.
The "seat outcome" of an election is the number of seats each party obtains. This seat outcome depends on how each registered voter in the state votes, and on the redistricting map in use to aggregate votes by district. The idea behind partisan fairness is that given how people vote, there is a fair seat outcome, and that the redistricting plan is fair if the seat outcome under this plan is close to the fair seat outcome. The following question is fundamental: what is the "fair" seat outcome, given the vote tally in each precinct in an election?

There are two alternative ideas as to what is "fair." One notion of fairness is an idea of symmetry: each party must be equally able to translate statewide vote share into seats. For instance, if two parties each net exactly half the votes, symmetry requires that they each are awarded half the seats. Despite its intuitive appeal, the Supreme Court of the United States has ruled that this idea of fairness as symmetry is "*based on a norm that does not exist in our electoral system.*"[16]

The Supreme Court of Pennsylvania proposed a different notion of fairness: the seat outcome is "neutral" if it is similar to the outcome we would expect if the electoral institutions were designed without considering partisan considerations. A redistricting map is "fair" under this second notion if it leads to neutral seat outcomes.

In practice, the symmetry and the neutrality notions lead to the same fair seat outcomes if voters for each party are distributed similarly across the state. However, if voters are distributed geographically so that even if two parties split the vote evenly, one party wins heavy landslides in a few areas while another party wins smaller majorities in a larger share of communities across the state, then the symmetric and the neutral notions of fairness diverge. Namely, if the redistricting map is drawn without partisan considerations, the party that wins smaller majorities over more communities will win most seats. Under the neutral notion, this unequal outcome is "fair," as it corresponds to the actual geographic distribution of voters' political preferences. Whereas, under the symmetry notion of fairness, the districts should be drawn to favor the party with concentrated support, until the map leads to an equal split of seats.

If the geographic distribution of partisan support is sufficiently uneven, the quest for symmetric outcomes comes into tension with other criteria, such as respecting Communities of Interest (Criterion C), respecting county and town boundaries (Criterion E), or compactness (Criterion F), because in order to favor the party with concentrated support enough for this party to attain a symmetric seat outcome, non-compact districts that break communities of interest and jurisdictions apart must be drawn. In Michigan, Democratic voters are more geographically concentrated, especially in urban areas, which might make it more difficult to draw districts with fully symmetric outcomes that also meet these other criteria.

We evaluate the maps according to several measures of symmetry and neutrality.

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[16] Opinion of the Court in Rucho v. Common Cause, 139 S. Ct. 2484, 2499 (2019).

Measures of partisan fairness

D1. **Partisan Bias**

The Partisan Bias[17] is a measure of symmetry for a given pair of parties, and for a given vote share. Given recent election results in Michigan, we compute it for the pair of two largest parties (Republican and Democratic), and for an equal vote share between these two parties.

The Partisan Bias is then the difference between the number of seats that the Republican Party wins, and the number of seats that the Democratic Party wins, given that each of the two parties obtains the same number of votes. Perfect fairness, under the symmetry notion, requires a Partisan Bias of zero. For less than perfectly fair values, it is standard to report them as percentages of the total number of seats in the delegation.

The Partisan Bias is a value obtained in a hypothetical election in which both parties obtained an equal number of votes. No such election exists. Instead, MGGG uses actual results from five elections to construct this tied hypothetical: the Governor's election, the U.S. Senate election, the Secretary of State election and the Attorney General election in 2018; and the Presidential election in 2016. For each of these elections, we construct a hypothetical election result in which the statewide vote share is tied, and in which the party that won the most votes in the real election wins only the districts in which it won the real election by a greater vote share margin than its statewide vote share margin. For instance, if the GOP candidate won the 2016 Presidential election by 0.2% of the vote, in the hypothetical tied election constructed from the 2016 Presidential results, GOP candidates only win districts in which in the real election the GOP candidate won by more than 0.2%.[18] We therefore obtain a Partisan Bias score for each of the five hypothetical elections. We average across all five to obtain the Partisan Bias score.

D2. **Efficiency Gap**

The Efficiency Gap[19] is a measure of symmetry in how parties translate statewide votes into seats. The Efficiency Gap is the difference in the number of "wasted" votes for each party, where all votes cast for a losing candidate and all votes cast for a winning candidate beyond the 50%+1 number necessary to win are deemed "wasted." The Efficiency Gap is typically expressed as a percentage of the total number of votes, so that it can be interpreted as the share of votes for a party that did not contribute to giving the party more seats.

If turnout is equal across districts, then the Efficiency Gap is just the difference between seat share, and 50% + 2(vote share – 50%). That is, under equal turnout, this symmetry measure defines the fair seat outcome to be such that parties with vote share between 25% and 75% get 2% seat share per each 1% of vote share above 25%. The measure is not meaningful, and not intended to be used in states in which a party gets more than 75% of votes.

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[17] Butler, David E. 1951. ''Appendix: An Examination of the Results.'' In The British General Election of 1950, ed.
H.G. Nicholas, 306–333. London, UK: McMillan.
[18] This construction is based on the idea of a "uniform swing", by which we shift vote share results by an equal percentage in every district, but it avoids the logical impossibility that arises when uniform swing pushes the vote share in some district below 0% or above 100%.
[19] Stephanopoulos, Nicholas O., and Eric M. McGhee. "Partisan gerrymandering and the efficiency gap." U. Chi. L. Rev. 82 (2015): 831.

This is one of four measures used by Dr. Handley in her memo on Partisan Fairness, presented to the MICRC on Oct. 1, 2021.[20]

D3. **Deviations from proportionality**
This is perhaps the simplest measure of symmetry. The deviation from proportionality is the difference between the seat share and the vote share. This is a second of the four measures used by Dr. Handley in her memo on Partisan Fairness, presented to the MICRC on Oct. 1, 2021.

D4. **Median-Mean difference**
The median-mean is a measure of symmetry that captures how difficult it is for a party to obtain a majority of the delegation.[21] Suppose we order the districts from least to most Republican, by vote share in a previous election. The median-mean difference then compares the vote share in the 7th most Republican district (the median in a delegation with 13 seats) to the statewide vote-share (the mean). If this number is positive, then the party can win seven districts (a majority of the delegation) even if it loses the vote statewide, and the magnitude of the median-mean difference shows by how much it can lose the statewide vote and still win seven seats.

This measure is more informative for state legislatures where winning the median district gives a party a majority. This is a third of the four measures used by Dr. Handley in her memo on Partisan Fairness, presented to the MICRC on Oct.1, 2021.

D5. **Lopsided Test**
The lopsided test is a measure of symmetry defined as the difference between the average vote share of Party A in the district won by Party A, and the average vote share of Party B in districts won by Party B. [22]

This is the fourth of the four measures used by Dr. Handley in her memo on Partisan Fairness, presented to the MICRC on Oct. 1, 2021.

D6. **Partisan Advantage**
The Partisan Advantage is a measure of neutrality that computes the difference between the seat outcome and a neutral benchmark based on the state's jurisdictions. This benchmark is the seat outcome in which seats are assigned to jurisdictions in proportion to their population.[23] The neutral benchmark depends on which list of jurisdictions we use: counties, or cities and towns. For the U.S. Congressional map in Michigan, we use the counties. For each county, the benchmark assigns seats in proportion to the population of the county, to the party that won most votes in this county. Aggregating by counties in this manner, the benchmark takes into account the geographic distribution of votes for each party across the state. The Partisan Advantage based on this county benchmark is then the difference between the seats that a party obtains given the map, and the seats that it would obtain under this county benchmark.

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[20] Handley, Lisa. "Measuring Partisan Fairness." Presented on Oct 1, 2021. Retrieved from: https://www.michigan.gov/documents/micrc/MICRC_Measuring_Partisan_Fairness_737248_7.pdf

[21] McDonald, Michael D., and Robin E. Best. "Unfair partisan gerrymanders in politics and law: A diagnostic applied to six cases." *Election Law Journal* 14.4 (2015): 312-330.

[22] Sam Wang, "Three Tests for Practical Evaluation of Partisan Gerrymandering," Stanford Law Journal, 16, June 2016.

[23] Jon X. Eguia. "A measure of partisan fairness in redistricting." *Election Law Journal*, forthcoming.

D7. **Outlier test**

The outlier test is a measure of neutrality based on comparing the seat outcome under a given map, to the distribution of seat outcomes under a large ensemble of alternative, computationally generated maps. It answers the question as to how exceptional is the seat outcome we see under the map under consideration.

We can compare the seat outcome under this map to the seat outcomes under the maps in the Public Ensemble, and under the maps in the Computational Ensemble. Since the Public Ensemble can be gamed by partisan actors submitting partisan plans, we see the Computational Ensemble as a neutral universe of possible plans drawn without partisan considerations, and we can compare each Proposed Draft map and the Public Ensemble against this neutral ensemble.

D8**. Other measures**

We note here that other measures of partisan fairness, some capturing a notion of symmetry, and others capturing a notion of neutrality, are publicly available through the web redistricting application DRA 2020 at www.davesredistricting.org

For readers' convenience, we published the four draft proposed congressional maps in DRA 2020 under the names: "MICRC Plan Apple", "MICRC Plan Juniper", "MICRC Plan Maple" and "MICRC Plan Birch." Under the "Advanced" tab, DRA 2020 displays several measures of partisan fairness, including variations of the ones we include in this report, for the Democratic Party. Included in their display is a votes-to-seats curve, mapping the Democratic seat share for any vote share. They also include a measure of Partisan Bias (D1), which they call "Seat Bias"; a measure of median-mean difference (D4), which they call "Votes Bias"; a measure of the Efficiency Gap (D2); a measure of deviation from Proportionality (D3); and a measure of Partisan Advantage (D6), which they call "Boundary Bias."

All these alternative measures are computed using a smoothing function of past election results: instead of recording whether a party lost or won a district as a binary 0 or 1 value, as in our report, the measures of DRA 2020 assign to the party a fraction between 0 and 1 of the seat in this district that is increasing in the party's vote share. The motivation is that DRA 2020 uses voting tallies in past elections not to determine what would have happened give those voting tallies under the new map (as we do in this report), but rather, to estimate what will probably happen in the future under the new maps. A narrow win in the past is then only a small indication that the party will win again in the future.

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The election data that we use to compute the measures in this section is as follows:

The 2018 Governor election; the 2018 Secretary of State election; the 2018 Attorney General election; the 2016 Presidential election; and the 2018 US Senate election, are used by the MGGG lab to report results on Partisan Bias (D1), Efficiency Gap (D2), Deviations from Proportionality (D3), Median-Mean Difference (D4), and the Outlier test (D7). And the 2014, 2016, 2018, and 2020 US House election, and the 2016 and 2020 US Presidential election, are used by Dr. Christian Cox from Yale University to compute the Lopsided Margins (D5) and the Partisan Advantage (D6). DRA 2020 allows users to choose their preferred election data input to compute the measures described under D9.

Results

We present the results on partisan fairness across all Proposed Draft maps for Michigan Congressional districts in the following table. Each row indicates a redistricting plan. Each column indicates a measure of partisan fairness, from D1 to D7. Positive numbers indicate deviations from the fair ideal that favor the Republican Party, and negative values indicate deviations that favor the Democratic Party. Zero indicates perfect fairness according to each measure. The values of some measures are in seats; others are in percentage of the total number of seats. The "Outlier" (D7) value indicates whether the map is more favorable to Republican candidates or to Democratic candidates than the median plan in the Computational Ensemble, and what share of maps favor this party less (so, for instance, "R 65%" would mean that a map is more favorable to the Republican Party than 65% of maps in the ensemble). Values above 95% indicate the map is an outlier. [Note: this measure is not yet available].

TABLE 4. *Measures of Partisan Fairness for Congressional District plans.*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Apple	+0.7 seats	+0.7%	-0.33 seats	+1.8%	+3.4%	+0.06 seats	
Plan Juniper	+1.7 seats	+6.7%	+0.47 seats	+2.0%	+4.5%	+0.39 seats	
Plan Maple	+1.7 seats	+6.7%	+0.47 seats	+2.1%	+4.5%	+0.73 seats	
Plan Birch	+0.7 seats	+5.0%	+0.27 seats	+1.7%	+4.1%	+0.06 seats	

Compare these results to the results on the measures of partisan fairness used by the Commission, as advised by Dr. Handley, displayed in the table below. The values below were obtained from a composite of all 13 statewide elections (Presidential, US Senate, Governor, Secretary of State, and State Attorney) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 5. *Selection of Measures of Partisan Fairness Used by the Commission.*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Apple	--	+1.3%	-1.5%	+2.4%	+4.0%	--	--
Plan Juniper	--	+0.8%	-1.5%	+2.2%	+4.0%	--	--
Plan Maple	--	+0.8%	-1.5%	+2.7%	+4.1%	--	--
Plan Birch	--	+0.7%	-1.5%	+2.2%	+4.1%	--	--

The values, and their differences across tables, can be interpreted as follows: first, on the measures common to both tables, measures D2, D4 and D5 are measures of symmetry that capture ways in which the political geography of Michigan favors the GOP. With the heavy concentration of Democratic voters in and around Metro Detroit, and smaller majorities for the GOP in most other areas of the state, Democratic candidates end up winning their districts (particularly the Detroit-based ones) by more lopsided margins (D5), so they waste more votes (D2), and their vote share in their seventh-best district is typically worse than the statewide vote share (D4).

Figure 2 illustrates this regularity, using the election results from the 2018 Senatorial election.[24] The horizontal axis shows the value of the median-mean difference, where greater values favor the GOP more. The gray bars represent the frequency of the observed value among the 100,000 computationally generated map, and the blue columns, among the 112 maps submitted by the public. When added together, nearly all 100,112 maps favor Republicans according to this measure. Values between 4% and 5% are typical. The four proposed plans are less favorable to Republicans than most others, with their values around 2%.
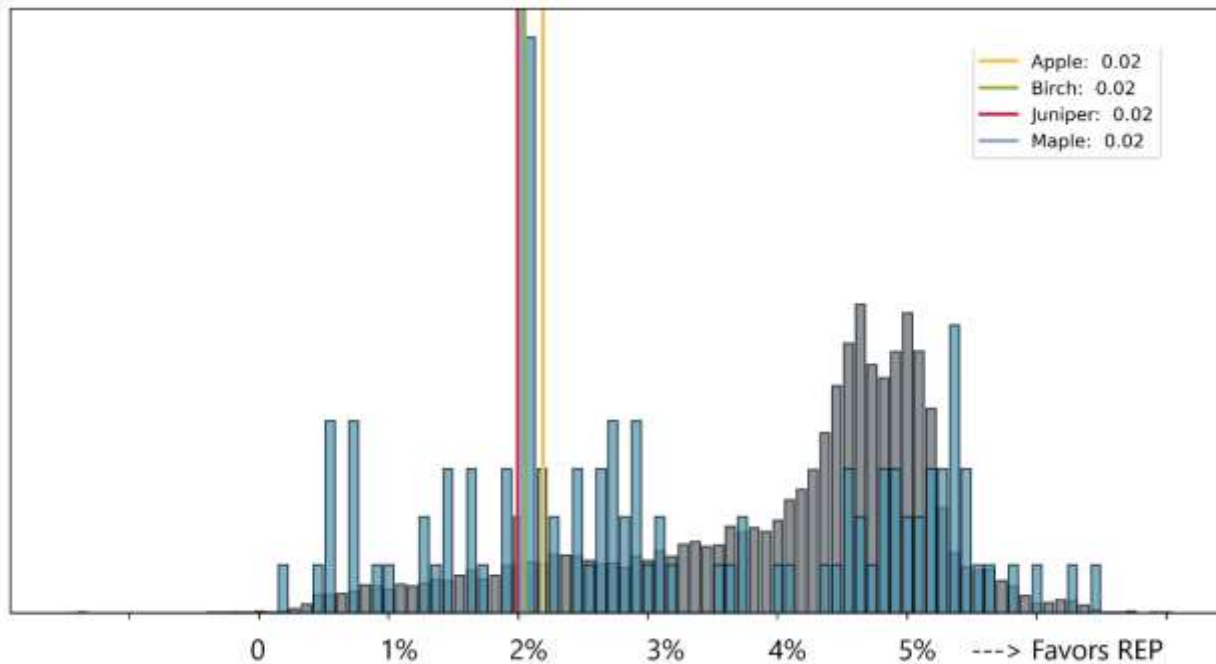

Figure 2 Median-Mean Difference, Congressional maps, Senate 2018 Election.

Proportionality (D3), in contrast, captures one way in which the political geography of the state favors Democrats. Since our election system favors more than proportionally parties that win more votes, and since the Democrats typically win more votes in Michigan statewide elections, if they were to replicate in U.S. House elections the kind of win margins that they obtained, in say, U.S. Senate elections, then they would win a more than proportional number of seats.

Second, the difference between the values in these measures from Table 4 to Table 5 is due to the different selection of election results to use to compute them; only the five statewide elections from 2016 and 2018 in Table 4, and the thirteen such elections from 2012 to 2020 in Table 5.

Third, Partisan Bias (D1) is another measure of symmetry that also reflects how the political geography of the state favors the GOP, so depending on the map, the GOP would likely win an extra seat or two in an election with tied vote share. In contrast, the Partisan Advantage (D6) finds

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[24] All graphs are based on whichever is the most representative of the five elections for which MGGG provided results for all 100,112 maps in the ensembles. That is, two of the other five elections would show results even more skewed to the right, and the other two would show results distributed closer to zero, so this one graph is the one least misleading, relative to comparing all five graphs side to side.

it fair that a party with a better distribution of voter support gets more seats for the same votes, and it only deems unfair the additional advantage attributable to electing representatives through districts drawn according to these plans. Under this standard, plans Apple, Birch and Juniper pass with flying colors: their deviation rounds out to zero. Only Maple shows a small Republican advantage.

The Outlier test (D7) finds a map unfair if the outcomes it generates are extreme, relative to what is normal under other maps. The test can be applied to any of the other measures, but it is most easily interpretable if applied to the number of seats, as in Figure 3.
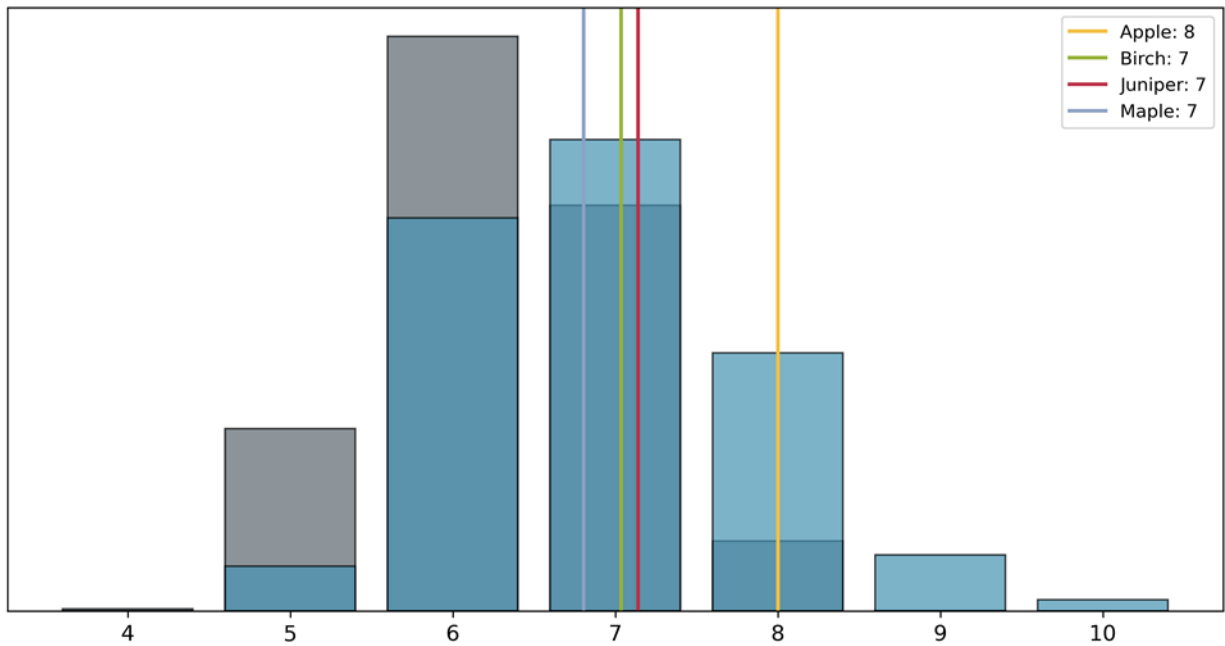

Figure 3. Number of Seats Democrats Would Win with Senate 2018 Results.

The horizontal axis in Figure 3 are numbers of seats that Democrats could win, with vote tallies according to the Senate 2018 election results (Stabenow (D) 52%-46% James (R)). The gray and blue bars, respectively, represent how many of the 100,000 Computer maps and the 112 maps submitted by the public Democrats would obtain such a number of seats with those election results. As we can see, under most maps, Democrats would obtain 6 or 7 (out of 13) seats, as they would under Birch, Juniper or Maple. These are normal maps that lead to normal outcomes. Under Apple they would obtain 8. That's among the most favorable maps for Democrats, and it is close to, but not quite an outlier, because quite a few maps would give them 8 maps as well. The publicly submitted maps that would let Democrats win 9 or even 10 seats are extreme outliers, never generated by the computer. But then, the computer is not motivated to draw partisan maps, the way passionate citizens can be. Since Democrats won this statewide election, some would argue that they should clearly win a majority of seats under a scenario where voters made the same partisan choices. All Commission maps meet this standard, but not all ensemble maps.

Across the 10 elections for which we have computed results (all five statewide elections in 2016 and 2018, the Presidential one in 2020, and all four US House elections from 2014 to 2020), and across most measures, Plan Apple is the most favorable to Democrats, followed by Plan Birch

and Plan Juniper, and Plan Maple the least so. It is easy to see why. Plans Birch, Juniper and Maple have six likely or safe Republican seats: one around Grand Rapids (number 4), others along the South (8), West (9), Thumb (10), Central LP (13) and UP (12). Plan Apple makes the Grand Rapids district a likely Democratic one instead, by dropping its GOP-leaning suburbs and linking urban Grand Rapids to urban (and Democratic-leaning) Kalamazoo.

All four of these plans appear to favor Republicans if measured according to measures that rate (almost) any plan as favoring Republicans, but the magnitudes of the values are not large. According to measures that discount the effect of the better geographic distribution of Republican voters, or that compare the performance of the plans to that of other possible maps, these four maps perform well. They generate a range of normal outcomes that one would expect to arise under maps that are not politically motivated.

These maps differ in their details, and some are slightly friendlier to one or the other party. Their differences notwithstanding, considering a range of measures of partisan fairness, Plan Apple, Plan Juniper, Plan Maple and Plan Birch are all generally fair to political parties. The Commission has sometimes discussed aiming for zero, or no partisan bias. That could still be a different useful benchmark, but it might be difficult to achieve given the rest of its mandates. Compared to maps not explicitly trying to achieve any partisan outcome, Commission maps mostly fall within the middle range. The same is true comparted to maps generated by the public.

CRITERION E: FAIRNESS TO CANDIDATES

"Districts shall not favor or disfavor an incumbent elected official or a candidate."

Understanding the criterion
This criterion prevents the kind of bipartisan gerrymander that arises when a cross-party coalition of mapmakers draws a redistricting map that makes districts safer for incumbents. It also rules out using the redistricting process to reward or to punish particular incumbent by drawing a district in which it is easier or harder to be reelected.

This criterion can be interpreted as a "process" criterion, or as an "outcome" criterion. As a "process" criterion, it would mean that districts shall not be drawn with the intent of favoring or disfavoring an incumbent or candidate; and that districts shall be drawn without considering their impact on any individual candidate. Interpreted as a "outcome" criterion would mean to leave aside the motivations, and it would require that the map approved do not favor or disfavor any candidate. Arguably, a literal, absolutist "outcome" interpretation would render the criterion impossible to satisfy (any map that reduces the number of districts from 14 to 13 must be unfavorable to at least one incumbent), the "outcome" interpretation must be laxer, and relative to what is feasible. We suggest a possible "outcome" interpretation to be that districts shall not favor or disfavor incumbents more than other potential alternative maps.

Measures of fairness to candidates
This criterion is one of two criteria in the Michigan Constitution that is not endorsed by the Brennan Center for Justice,[25] and the social science literature around it is much more limited. If we interpret it as a "process" criterion, the best evaluation is qualitative: analyzing the publicly posted videos of the MICRC meetings to check whether implications for a given incumbent or candidate were taken into account. Although we did not observe all ICRC meetings, we did not see any overt attempt to harm or help a particular candidate or incumbent.

Interpreted as an "outcome" criterion, we can quantify two measures of favoring or disfavoring incumbents as a whole.

The first is so-called "double-bunking", by which two (or more) non-term limited incumbents are placed in the same new district.

The second is to consider the competitiveness of the new districts. While competitiveness is not a criterion in the Michigan Constitution, and thus it is not an in itself a legally desirable district characteristic, competitiveness relates to favoring or disfavoring incumbents. Low competitiveness favors incumbents; high competitiveness disfavors them. We thus argue that the criterion of neither favoring nor disfavoring incumbents indirectly calls for intermediate, or normal according to historical standards, levels of competitiveness.

We can quantify competitiveness (or, more accurately, "swingness" or "flippability") by the fraction of recent elections in which a party other than the one that most frequently wins, won the most votes in the district. A district in which other parties -- besides the one that typically wins -- never

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[25] Yurij Rudenski and Annie Lo. "Creating strong rules for drawing maps." *Brennan Center for Justice* report, last updated January 29, 2020.

win is under this measure non-competitive, whereas a district in which other parties win quite often is highly competitive (or "highly swingy" or "easy to flip").

Results

The analysis on double-bunking (placing two incumbents in the same new district) is underway, and not yet available.

On competitiveness, plans Apple, Maple and Juniper have two closely contested, competitive districts that can swing and be won by either party under the range of recently observed election results: A Capital Region district centered in the Greater Lansing area (# 5), and district based on the southern half of Macomb Co. (#6). Plan Birch makes the Macomb Co. District 6 lean clearly Democratic by shifting it westward into heavily Democratic areas in Oakland County, reducing the number of competitive or swing districts to just one (the "Capital Region" district #5).

If we compare these results to those of the ensembles, we see that most maps feature three or four competitive districts. In other words, these plans, especially Birch, would feature a higher number of safe incumbents than most other plans. Under Plan Birch, the only challenges likely to succeed in unseating an incumbent in a general election would be those in District 5. Figure 4 illustrates this finding. Perhaps in an effort to respond to public requests for districts that fit local views of the boundaries of their areas, the Commission seems to have moved toward politically homogenous districts. Although staff have advised the Commission that competitiveness is not an explicit criterion, we note that respecting Communities of Interest does not require creating homogenous districts or responding to public requests that advise not joining together Democratic and Republican areas.
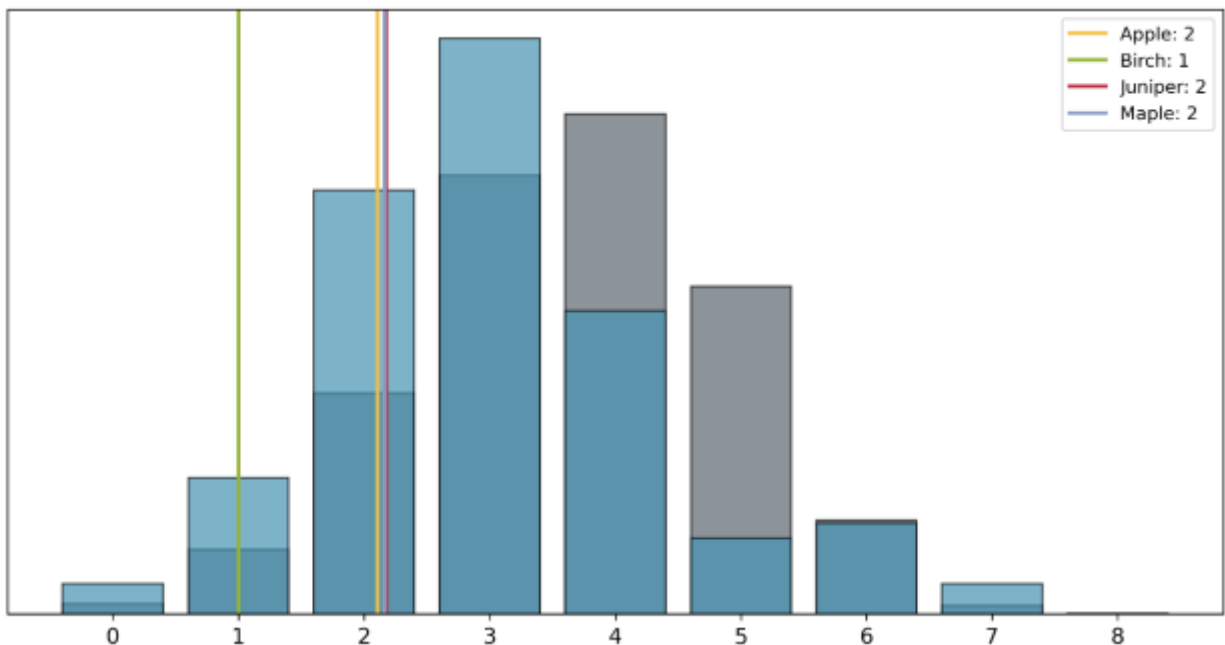

Figure 4. Number of Competitive Congressional Districts

CRITERION F: JURISDICTIONAL BOUNDARIES

"Districts shall reflect consideration of county, city, and township boundaries."

Understanding the criterion

This criterion says that, to the extent possible, jurisdictions such as counties, cities and townships should each be kept whole in the same district. District boundaries should follow county or township boundaries and should not cut across jurisdictions splitting them into pieces that belong to different districts. This is a traditional redistricting criterion. Indeed, representation by county, city and township historically precedes the drawing of electoral districts, and at the origins of American democracy, counties were drawn precisely to have the right size and shape to serve as units of representation.[26]

Some counties, cities and townships can also be communities of interest, and respecting the boundaries of these jurisdictions is then covered as a higher criterion. But even the boundaries of jurisdictions that are not communities of interest shall be considered, albeit as a lower priority.

Population equality requires splitting some counties, cities and towns. Given that some splits are necessary, questions arise: is it better to minimize the number of jurisdictions that get split? Or to minimize the number of times that a jurisdiction is split?

Measures of respect for jurisdictional boundaries

The standard way to measure satisfaction of this criterion is to count the number of splits. But we can compute what is the minimum number of county, city and township splits, and we can compare it to the number of county, city, and township splits in the map.

With given weights for county splits, city splits, and township splits, we could even produce a single measure of splits. But the Constitution does not provide such weights.

We count:

E1. Number of counties, cities and towns that are split.

E2. Total number of times that counties, cities and towns are split, resulting in the total number of pieces of each of these units assigned to different districts.

Results

We present results on county splits. Results on city, town and township splits are underway and are not yet available.

TABLE 6. Split counties and County Splits		
	Split Counties	Number of Pieces
Plan Apple	17	40
Plan Juniper	13	31
Plan Maple	13	33
Plan Birch	13	33
2011 Map	10	14

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[26] Kromkowski, Charles A. 2002. Recreating the American Republic. Cambridge, UK: Cambridge University Press. In particular, county lines were drawn so that a horse rider could reach the county seat in one day of riding from any point in the county.

These maps do a poor job at respecting county boundaries compared to the ensembles.

As Figure 5 shows, they are outliers in their disregard for county boundaries, compared to the maps in the Computer Ensemble, and compared to the official congressional district map for 2011-2020 (even though that one required to draw 14 districts, which induces a greater number of county splits). Plan Apple's connection of urban Grand Rapids with urban Kalamazoo comes at the cost of splitting the counties of Kent, Allegan, Barry and Kalamazoo, which are kept whole in the other plans.
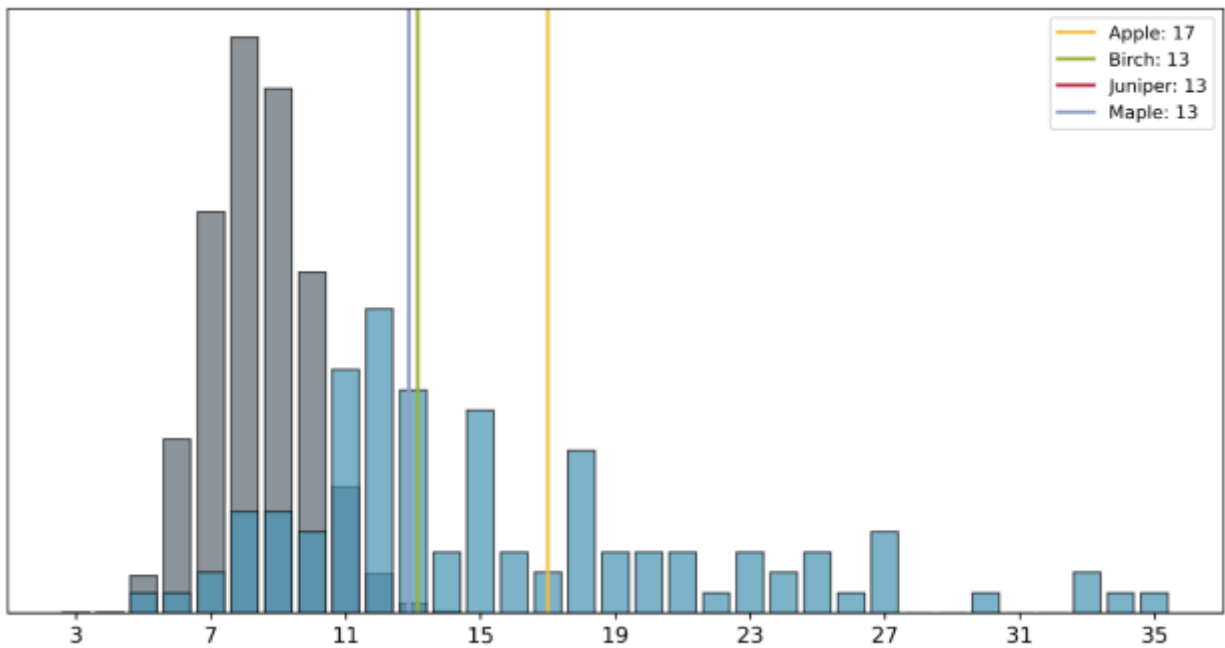

Figure 5. Number of Split Counties

CRITERION G: COMPACTNESS

"Districts shall be reasonably compact."

Understanding the criterion

Reasonably compact districts are chunky and squat, with shapes that are square, rounded, or like potatoes without arms, legs, tendrils and tentacles venturing out and away from the heart of the district. Formally, there are shapes that have a lot of area relative to their perimeter (the length of their border), and that have all their area relatively close to their center. This criterion can be visually apprehended: if a district seems weirdly or funnily shaped, it is likely not compact.

This criterion, however, is the last and lowest priority, secondary to all the others. It is the only one of the seven criteria in the Michigan Constitution that the Brennan Center for Justice explicitly recommends against taking into account. Because compactness is the easiest criterion to assess at first glance, there a risk that a superficial evaluation may be overly swayed by compactness. Redistricting plans with very compact districts may be unacceptable if they fail to satisfy higher-ranked criteria, and conversely, less compact districts in other plans that better satisfy higher-ranked criteria may be "reasonably compact" enough.

Measures of compactness

G1. **Polsby-Popper** compactness score.
This measure is the ratio of the area of the district to the area of a circle whose circumference is equal to the perimeter of the district. Mathematically, it is defined for each district as: 4π times the area of the district, divided by the square of the district's perimeter (boundary). $\frac{4\pi\ Area}{(Perimeter)^2}$

A score of 1 is maximally compact (a circle attains this score), while a score of 0 is minimally compact (a straight line). We report the minimum and the average score across all districts.

G2. **Reock** compactness score

The Reock compactness score of a district is defined as the ratio of the area of the district to the area of the smallest circle that would completely enclose the district.

Again, the minimum value is zero, and the maximum compactness, attained by a circular district, is 1.

We report the minimum and the average score across all districts.

G3. **Number of cut edges**
An alternative approach is to consider compactness -- not with respect to the physical geography of the land -- but with respect to the network graph of voting precincts. Construct a network by considering each precinct a node (informally, a dot), and drawing a connecting edge (link) between any two nodes that are physically adjacent. Then superimpose a district map on this network, and then count the number of edges (links) that connect nodes in separate districts. These edges are interpreted to be "cut" by the district map. Compact districts will cut few edges, whereas snaking non-compact ones will cut many more.
We report the number of cut edges.

Results

In the next table, for each redistricting plan in each row, we provide the Polsby-Popper, Reock and Cut Edges measures of compactness, respectively in columns 1, 2 and 3.[27]

TABLE 7. *Compactness Measures in Congressional District Plans*			
	Polsby-Popper	Reock	Cut Edges
Plan Apple	0.38	0.38	715
Plan Juniper	0.38	0.39	697
Plan Maple	0.38	0.39	682
Plan Birch	0.38	0.40	697
2011 map	0.29	0.36	n.a.

Recall that Polsby-Popper and Reock are measures of compactness from 0 (not compact), to 1 (a perfectly compact circle); whereas, Cut Edges is a measure of violation of compactness that loosely, tracks the number of precincts located at the borders of a district (the less compact, the greater number of precincts at the border). The maps perform similarly, with once again Apple slightly worse than the others, probably due to that elongated configuration of District 4 from Grand Rapids to Kalamazoo.

All four maps are reasonably compact, much more so than the official map in the previous redistricting sample, and about as much as typical maps in the Ensembles, as illustrated in Figure 6.
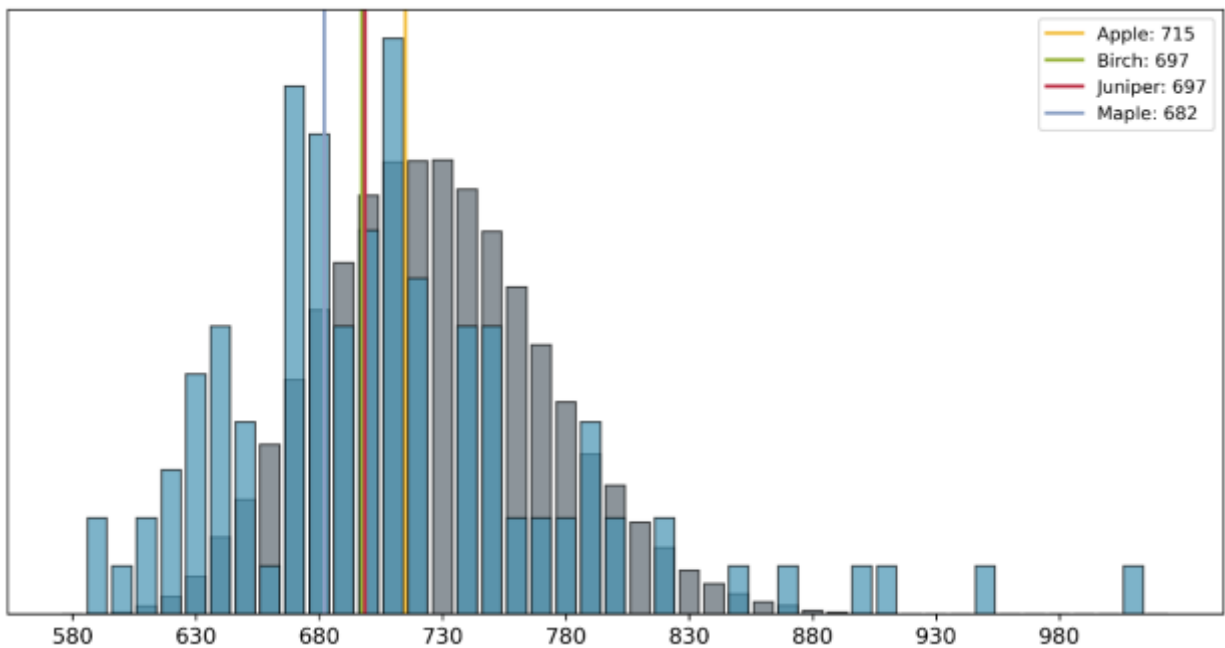

Figure 6. Number of Cut Edges (fewer is more compact).

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[27] The Reock and Polsby-Popper measure are as reported by DRA 2020. The Cut Edges is computed by MGGG for this report.

III.3. SUMMARY OF RESULTS

Plans Apple and Maple are complete redistricting plans. Plans Juniper and Birch are not, as they leave a score of residents each in a single U.S. Census block unassigned to any precinct. These omissions are easy to fix by assigning these two U.S. Census blocks to the district of an adjacent block, which would not alter results in any meaningful way.

All four plans feature small deviations from population equality, below 0.3%.

All four feature two districts with more than 40% of their Voting Age Population identifying as "Black", but none feature a district with a majority of the VAP identifying as "Black" (the previous plan featured two).

All four satisfy contiguity. While all four feature districts that represent geographically recognizable areas that can be meaningfully described in few words, it is unclear how these districts reflect the collection of Communities of Interest in the state of Michigan.

All four plans perform well overall according to a collection of accepted measures of partisan fairness.[28] Plan Apple is the most favorable to Democrats of the four, and Plan Maple the most favorable to Republicans, but the differences between them amount to less than a seat on average.

While the exact boundaries vary, these four plans are similar. Juniper and Maple feature five districts that are safe or leaning Democratic, two swing districts, and six districts that are safe or leaning Republican. The five Democratic districts are: one based on Detroit (1), one on West Wayne County (2), one on Oakland County (3), one on Ann Arbor (7), and one on the Tri-cities/Flint (11). The two swing districts are one in the Capital Region (5), and one based on Macomb County (6). The six Republican districts are one around Grand Rapids (4), one along the South (8), one along the West Lakeshore (9), one based on the Thumb (10), one in the North and UP (12) and one in the Central-North Lower Peninsula (13). Plan Birch pushes the Macomb swing district (6) westward into Oakland, making it into a 6th Democratic district. Plan Apple keeps the two swing districts (5 and 6), but it transforms the Republican Grand Rapids district (4) into a 6th Democrat district by shedding its outer suburbs and connecting Grand Rapids to Kalamazoo instead.

These plans feature relatively few competitive seats, so most districts will be deemed safe for their incumbents.

These plans fail to reflect consideration of county boundaries, but they are reasonably compact.

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[28] The plans do not perform well on each individual measure. It is impossible to score well on all at the same time, as different measures have conflicting demands. We mean that, overall, taking their scores across all measures, the maps perform well on this criterion.

PART IV. ANALYSIS OF PROPOSED DRAFT MAPS FOR MICHIGAN'S SENATE DISTRICTS

IV.1. THE PROPOSED DRAFT MICHIGAN SENATE DISTRICT MAPS

On October 11, the MICRC approved the following Proposed Draft maps for Michigan Senate districts, for consideration in the Second Round of Public Hearings (Oct 20 – Oct 27, 2021): [29]

-Plan "Spruce", name "10-08-21 v1 SD" (map number #226). Voted for publication 13-0.
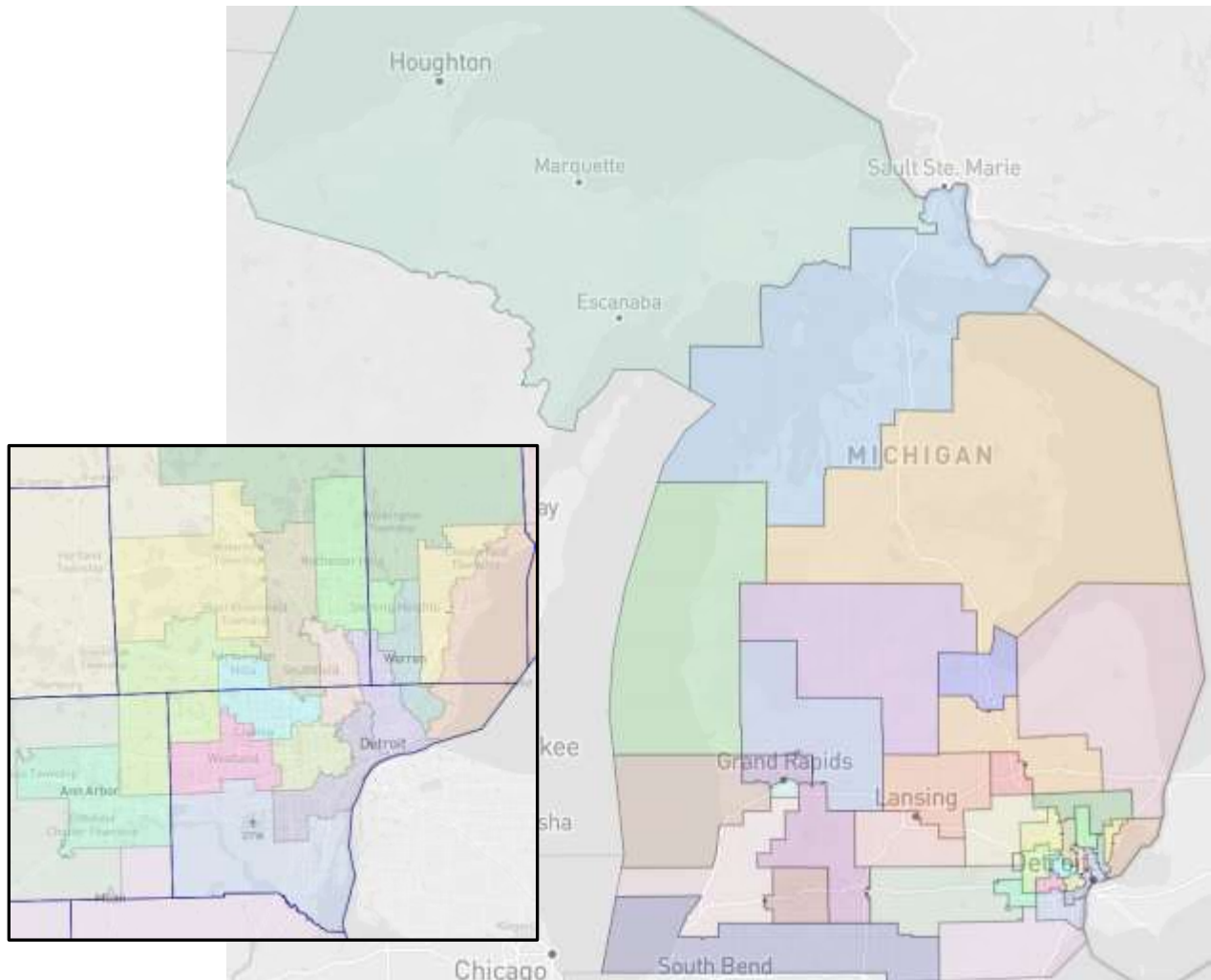
Plan Spruce

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[29] These maps are available for download here:
https://michigan.mydistricting.com/legdistricting/michigan/comment_links

-Plan "Elm", name "10-04-21 v2 SD" (map number #199). Voted for publication 12-1.

Note that the Elm map does not appear to be a valid redistricting plan, as it fails to assign a district to all the areas of Michigan. Plan Elm fails to assign any district to Census Block 4006 in Census Track 1590, in Southfield Township (Oakland County).[30] This block has 13 inhabitants.
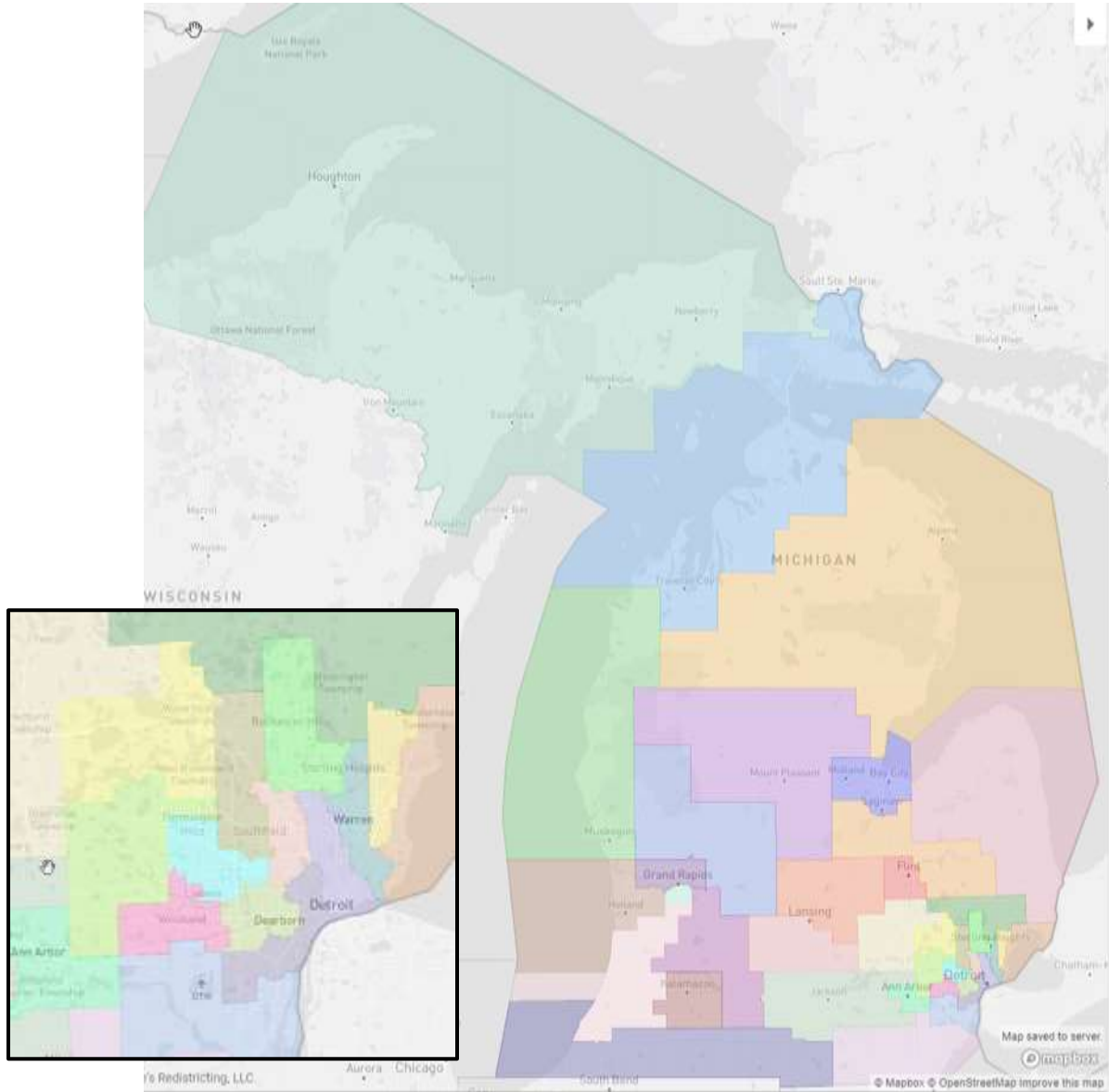
Plan Elm (incomplete)

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[30] https://tigerweb.geo.census.gov/tigerweb2020/

-Plan "Cherry", name 10-07-21 SD RAS BK (map number #220). Voted for publication 13-0.

Note that the Cherry map does not appear to be a valid redistricting plan, as it fails to assign a district to all the areas of Michigan. Plan Cherry fails to assign any district to a precinct with population 1,946 in the neighborhood of Anchor Bay Shores in Macomb County. This area, highlighted in red in the inset map below, must be assigned to a district.
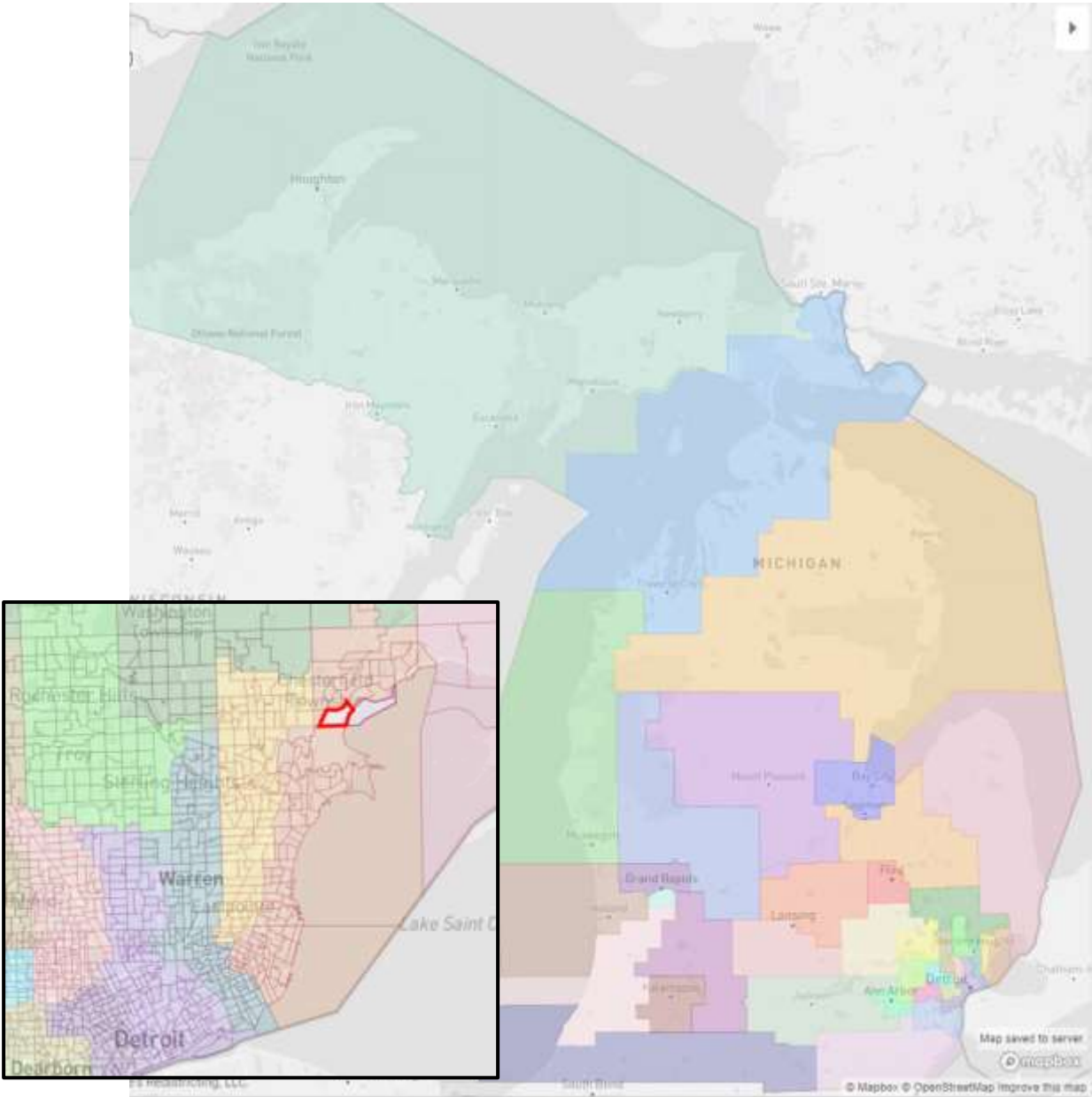
Plan Cherry (incomplete)

IV.2. MEASURING PERFORMANCE ON EACH CRITERIA

CRITERION A: POPULATION BALANCE AND VOTING RIGHTS ACT

"Districts shall be of equal population as mandated by the United States constitution, and shall comply with the voting rights act and other federal laws."

Understanding the Criterion

The Michigan population according to the 2020 US Census is 10,077,331 inhabitants. Michigan has 38 districts for state senate elections. So, the ideally equal population is 265,193 inhabitants per district. The United States Supreme Court has ruled that, solely on US constitutional grounds, the population in state legislative districts must be roughly equal; however, "some deviations from the equal-population principle are constitutionally permissible," for a rational state interest, and in particular to respect jurisdictional boundaries of counties, cities and towns.[31] In particular, population differences of up to 10% between the least and most populous districts are "minor" and do not require "justification from the State."[32] Population deviations greater than 10% must be justified by the State, and instances with a deviation as large as 89% away from the ideal size have been deemed legitimate.[33] However, the Equal Population federal requirement under the US Constitution is much tighter for federal elections to the US House of Representatives, in which any population deviation requires justification, and the largest deviation that has been found acceptable is 0.79% (as discussed in the section relating to Criterion A in the evaluation of the Congressional map).

If there is any substantial deviation from population equality, supporters of one party cannot be systematically placed in larger districts.[34]

In explicitly mentioning "equal population as mandated by the U.S. Constitution" as the first clause of the top priority criterion, the Michigan Constitution leaves it open to interpretation if it means no more than the lax standard of equal population for state legislative districts under the U.S. Constitution, or the stricter standard of equal population for federal elections to the U.S. House of Representatives … or something in between these two extremes.

With regard to the Voting Rights Act, we refer verbatim to the discussion of Criterion A under Section III.2. for the Congressional maps.

Measures of performance on Criterion A

A1**. Measure of population inequality**
We compute the difference between the most and least populous district, using the formula:

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[31]Reynolds v. Sims, 377 US 579-580.
[32] Brown v. Thomson, 462 US 842.
[33] Brown v. Thomson, 462 US 835.
[34] *Cox v. Larios*, 542 U.S. 947

$$\frac{Population\ of\ most\ populous\ district}{Population\ of\ least\ populous\ district} - 1,$$

in percentage points.

For convenience, we also report the largest deviation to the ideal population size of a district, namely,

$$\frac{Population\ of\ most\ populous\ district}{265,193} - 1,$$

again, in percentage points.

If the difference between the most and least populous district surpasses 1%, we also compare the average population of districts won by Democratic Party candidates to the average population of districts won by Republican Party candidates, in all U.S. Presidential or Michigan Senate elections from 2014 to 2020 (namely, the 2016 and 2020 Presidential elections, and the 2014 and 2018 Michigan Senate elections). This is a measure of partisan malapportionment.

A2. **Number of Districts of Opportunity**.

As discussed in Section III.2.A2 with regard to the application of the Voting Rights Act to Congressional district maps, we seek to compute the number of districts of opportunity for ethnic and linguistic minorities. We can then compare this number to the proportion of minority population. For instance, the "Black Alone" population is 13.7% of the Michigan population (with a percentage as high as 37.6% in Wayne Co.), a statewide percentage that corresponds to at least five senatorial districts. Further, 5.6% of the Michigan population is Hispanic or Latino community, a percentage that corresponds to two senatorial districts (though in this case the highest concentration by county is 15.4% in Oceana Co.); and 3.3% of the state population is Asian-American (with 9% in Washtenaw Co.), a percentage that corresponds to one senatorial district.

We can also compare the number of opportunity districts for the black minority to the number of such opportunity districts in the previous redistricting plan. We refer to the report "determining if a redistricting plan complies with the Voting Rights Act" by Dr. Lisa Handley, presented to the MICRC. If Dr. Handley's estimates are correct, any 40% Black district is a district of opportunity and will elect candidates preferred by the Black minority.

If so, there were three (or six at the lower threshold of 35%) Black districts of opportunity in the previous redistricting plan.

So, the measure we report is:

-Number of districts with >50% of their voting age population identifying as Black.

-Number of districts with >40% of their voting age population identifying as Black.

-Number of districts with >35% of their voting age population identifying as Black.

We compare these measures to the number of districts (five) proportional to the Black population in the state, and to the number of districts with these percentages of Black voting age population in the previous congressional districts plan (two, five and six).

We do not find a sufficient geographic concentration of Hispanic or Latino, or other minorities, in any county, to constitute a majority in a geographically compact district.

Results

We present the results on Population Equality in the following table. Each row indicates a redistricting plan for MI Senate districts. The first column reports the population difference between the most and the least populated district. The second column reports the maximum deviation from the ideal district population. And the third column reports the partisan malapportionment measure, with a result bigger than zero meaning that districts won by Democrats have more population (which indicates an advantage to the Republican Party), and thus negative numbers indicating that districts won by Republicans have more population (which indicates an advantage to the Democratic Party).

TABLE 8. *Population Equality in Draft Proposed Senate Plans*			
	Pop. difference	**Max. deviation**	**Partisan malapportion.**
Plan Spruce	9.02%	4.89%	0.32%
Plan Elm	9.45%	5.22%	-0.03%
Plan Cherry [*]	*5.06%*	*2.50%*	*-0.29%*

[*] Recall that Plan Cherry is not a valid plan, as it fails to assign a district to each precinct. Population Equality measures will change if the plan is remedied by assigning a district to each precinct.

These deviations are within the range that is acceptable for state legislative districts under the US Constitution, but they are not within the range of deviations that are potentially acceptable (if suitably justified) for congressional districts under the US Constitution. If the explicit Population Equality clause under the Michigan Constitution were understood to be stricter than the population equality requirement implicit in the federal Equal Protection clause, then these deviations would be too large.

We report the number of districts in which more than 50%, more than 40%, and more than 35% of the Voting Age Population identifies as "Black" or "African-American" (alone), as computed by the MGGG Lab, in the following table. These numbers, serve as proxy for the number of Black-minority districts of opportunity.

TABLE 9. *Black Minority Districts of Ppportunity in State Senate Draft Proposed Maps*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Spruce	0	3	6
Plan Elm	0	3	6
Plan Cherry [*]	*0*	*3*	*6*
2011 Official map	2	5	6
Proportional to Pop.	5		

As in the case of the congressional maps, the most striking result is that neither of the two majority-minority districts in the previous plans survives in any of these three proposed plans. The following graph shows the Black share of the Voting Age Population in each district. Districts are ordered from lowest to highest Black share (that is, the labels in the horizontal axis are not the district number in the Plan; rather, they should be interpreted as lowest Black VAP share (1), 2nd lowest Black VAP share (2), all the way to the district with the highest Black VAP share (38). The

colored dots represent each map. The boxes represent the typical Black VAP shares in maps in the Computational Ensemble, and the arms stretching out of the boxes represent the Black VAP share at the borderline extreme map such that only 2.5% of maps have shares above or below the range covered by the arms.
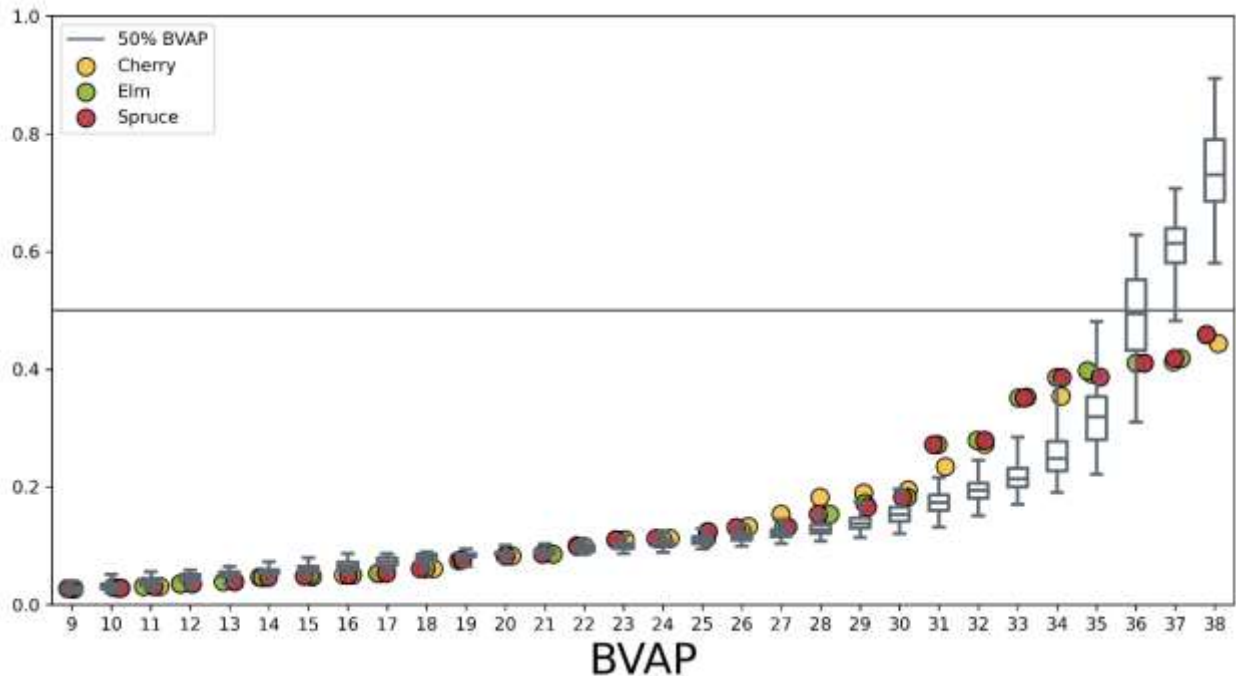

Figure 7. Distribution of Black VAP by Senate District

As we can see, these three Senate plans are extremely unusual in engineering maps without a single majority-Black district. Almost all Senate maps in the Computer Ensemble feature two majority-Black districts; and a half feature three. These maps appear to deliberately dilute concentrations of Black voting age population above 50%, to create instead as many districts as possible in which the Black vote constitutes a large minority above 35%. All four of these plans generate six such districts with a large Black minority, which is twice as many as in most other maps.

The large distance between the dots representing these three plans, and the arms of the boxes representing the computer-generated plans imply that the probability that plans like these without a Black-majority district arise by chance are remote. Rather, these plans' outcome with no majority-Black district, and twice as many districts with a large minority of Black voters as in most other plans, is attained by design, following the advice to the Commission formulated by its VRA Legal Counsel and its VRA Consultant.

CRITERION B: CONTIGUITY

"Districts shall be geographically contiguous. Island areas are considered to be contiguous by land to the county of which they are a part."

Understanding the Criterion
See the discussion under Section III.2.B on the analysis of Congressional districts.

B1. **Measure of Contiguity**
We report a binary "Yes" or "No" for whether a plan satisfies the stricter definition of contiguity, satisfying rook contiguity with islands attached to the land at the nearest point in the county of which they are a part of.

Results
All three draft proposed Michigan Senate maps satisfy contiguity.

TABLE 10. *Contiguity*.	
	Are all districts contiguous?
Plan Spruce	Yes
Plan Elm	Yes
Plan Cherry	Yes

CRITERION C: COMMUNITIES OF INTEREST

"*Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests. Communities of interest do not include relationships with political parties, incumbents, or political candidates.*"

Understanding the Criterion
See the discussion under Section III.2.C on the analysis of Congressional district maps. The only relevant difference in the application of this criterion to the Senate district maps is that in order for a Community of Interest to be kept together in a single Senate district, it must be a community smaller than the size of such district, namely, no larger than approximately 265,000 inhabitants.

C1. **Measure of Respect for Communities of Interest**
See the discussion under Section III.2.C on the analysis of Congressional district maps.

Results.
The quantitative analysis on COI cluster splits is underway by the MGGG Lab and is not yet available.

CRITERION D: PARTISAN FAIRNESS

"Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness."

Understanding the Criterion
See the discussion under Section III.2.D on the analysis of the Congressional district maps, verbatim.

Measures of partisan fairness

D1. **Partisan Bias**

D2. **Efficiency Gap**

D3. **Deviations from proportionality**
Measures D1-D4 are exactly as described in Section III.2.D.

D4. **Median-Mean difference**
The median-mean is a measure of symmetry that captures how difficult it is for a party to obtain a majority of the delegation.[35] Suppose we order the districts from least to most Republican, by vote share in a previous election. The median-mean difference then compares the vote share in the average of the 19th and 20th most Republican districts (these two are the median districts in a map of 38 senatorial districts) to the statewide vote-share (the mean). If this number is positive, then the party can win nineteen seats (half of the Michigan Senate) even if it loses the vote statewide, and the magnitude of the median-mean difference shows by how much it can lose the statewide vote and still win nineteen seats and come closer to winning the 20th than to losing the 19th.

This measure is more informative for state legislatures, where winning the median district gives a party a majority.

D5. **Lopsided Test**
Exactly as described in Section III.2.D.

D6. **Partisan Advantage**
The Partisan Advantage is a measure of neutrality that computes how much the seat outcome deviates from a neutral benchmark based on the state's map of jurisdictions (counties, cities and towns). This benchmark is the seat outcome in which seats are assigned to jurisdictions in proportion to their population.[36] The list of jurisdictions we use to compute the neutral benchmark for the redistricting plan for the Michigan Senate, contains the seventy-nine counties with

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[35] McDonald, Michael D., and Robin E. Best. "Unfair partisan gerrymanders in politics and law: A diagnostic applied to six cases." *Election Law Journal* 14.4 (2015): 312-330.
[36] Jon X. Eguia. "A measure of partisan fairness in redistricting." *Election Law Journal*, forthcoming.

population smaller than two ideal Senate districts (530,396 inhabitants). It also contains the largest cities and townships in the four counties with population greater than this threshold (Wayne, Oakland, Macomb and Kent), taking out from each county and adding to the list as many of the largest cities and towns as needed until the rest of the county has fewer than 530,396 residents; this rest of the county is then also included in the list. For each jurisdiction in this list, the jurisdictional benchmark assigns seats in proportion to the population of the jurisdiction, to the party that won most votes in this jurisdiction. Aggregating by jurisdictions in this manner, the benchmark takes into account the geographic distribution of votes for each party across the state. The Partisan Advantage based on this jurisdictional benchmark is then the difference between the seats that a party obtains given the map, and the seats that it would obtain under this jurisdictional benchmark.

D7. **Outlier test**
Exactly as described in Section III.2.D.

D8. **Other measures**
We note here that other measures of partisan fairness, some capturing a notion of symmetry, and others capturing a notion of neutrality, are publicly available through the web redistricting app DRA 2020 at www.davesredistricting.org

For readers' convenience, we published the three draft proposed Senate maps in DRA 2020 under the names: "MICRC Plan Spruce", "MICRC Plan Elm" and "MICRC Plan Cherry". Under the "Advanced" tab, DRA 2020 displays several measures of partisan fairness, including variations of the ones we include in this report, for the Democratic Party. Included in their display is a votes-to-seats curve, mapping the Democratic seat share for any vote share. They also include a measure of Partisan Bias (D1), which they call "Seat Bias"; a measure of median-mean difference (D4), which they call "Votes Bias"; a measure of the Efficiency Gap (D2); and a measure of deviation from Proportionality (D3).

All these alternative measures are computed using a smoothing function of past election results: instead of recording whether a party lost or won a district as a binary 0 or 1 value, as in our report, the measures of DRA 2020 assign to the party a fraction between 0 and 1 of the seat in this district that is increasing in the party's vote share. The motivation is that DRA 2020 uses voting tallies in past elections not to determine what would have happened give those voting tallies under the new map (as we do in this report), but rather, to estimate what will probably happen in the future under the new maps. A narrow win in the past is then only a small indication that the party will win again in the future.

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The election data that we use to compute the measures in this Section is again:

The 2018 Governor election; the 2018 Secretary of State election; the 2018 Attorney General election; the 2016 Presidential election; and the 2018 US Senate election, are used by the MGGG lab to report results on Partisan Bias (D1), Efficiency Gap (D2), Deviations from Proportionality (D3), Median-Mean Difference (D4), and the Outlier test (D7). And the 2014 and 2018 Michigan Senate election, and the 2016 and 2020 US Presidential election, are used by Dr. Christian Cox from Yale University to compute the Lopsided Margins (D5) and the Partisan Advantage (D6).

DRA 2020 allows users to choose their preferred election data input to compute the measures described under D8.

Results

We present the results on partisan fairness across all Proposed Draft maps for Michigan Senate districts in the following table. Each row indicates a redistricting plan. Each column indicates a measure of partisan fairness, from D1 to D7. Positive numbers indicate deviations from the fair ideal that favor the Republican Party, and negative values indicate deviations that favor the Democratic Party. Zero indicates perfect fairness according to each measure. The values of some measures are in seats; others are in percentage of the total number of seats. The "Outlier" (D7) value indicates whether the map is more favorable to Republican candidates or to Democratic candidates than the median plan in the Computational Ensemble, and what share of maps favor this party less (so, for instance, "R 65%" would mean that a map is more favorable to the Republican Party than 65% of maps in the ensemble). Values above 95% indicate the map is an outlier. [Note: this measure is not yet available].

TABLE 11. *Measures of Partisan Fairness for Senate District Plans*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Spruce	+5.3%	+3.0%	-0.3 seats	+3.0%	+5.4%	+0.4 seats	
Plan Elm	+5.3%	+3.1%	-0.3 seats	+3.5%	+5.2%	+0.2 seats	
Plan Cherry[*]	*+2.7%*	*+2.5%*	*-0.5 seats*	*+2.8%*	*+4.5%*	*-0.3 seats*	

[*] Recall that Plan Cherry is not a complete plan, as it fails to assign a district to each precinct. Results will change if Plan Cherry is remedied by assigning all precincts to become a complete redistricting plan.

Compare these results to the results on the measures of partisan fairness used by the Commission, as advised by Dr. Lisa Handley, displayed in the table below. The values below were obtained from a composite of all thirteen state-wide elections (Presidential, US Senate, Governor, Secretary of State, and State Attorney) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 12. *Selection of Measures of Partisan Fairness Used by the Commission.*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Spruce	--	+3.1%	-0.3%	+2.7%	+4.0%	--	--
Plan Elm	--	+6.2%	+2.1%	+3.4%	+4.0%	--	--
Plan Cherry[*]	--	*+3.4%*	*-0.3%*	*+2.2%*	*+4.1%*	--	--

Once again, because the political geography of Michigan concentrates Democratic voters more than Republican voters, measures that seek symmetric outcomes (D1, D2, D4 and D5) for both parties detect that under these maps (just as under almost any other map), the GOP is favored. The measure that sets the advantage stemming from a favorable political geography aside and evaluates only the net partisan added effect of the maps (D6) shows that these maps are all very close to fair. And proportionality (D3) ends up close to fair again, through two opposing factors that cancel out: proportionality requires winning parties to win smaller seat majorities that they typically do, and this effect favors the Democrats, just about cancelling the effect of political geography.

Figure 8 illustrates that these plans are more favorable to Democratic candidates than many other maps (Democratic candidates win one additional seat than under the average map), but they are within the normal range, not extreme outliers. The public and computer ensembles both produce more maps that would favor Republicans.
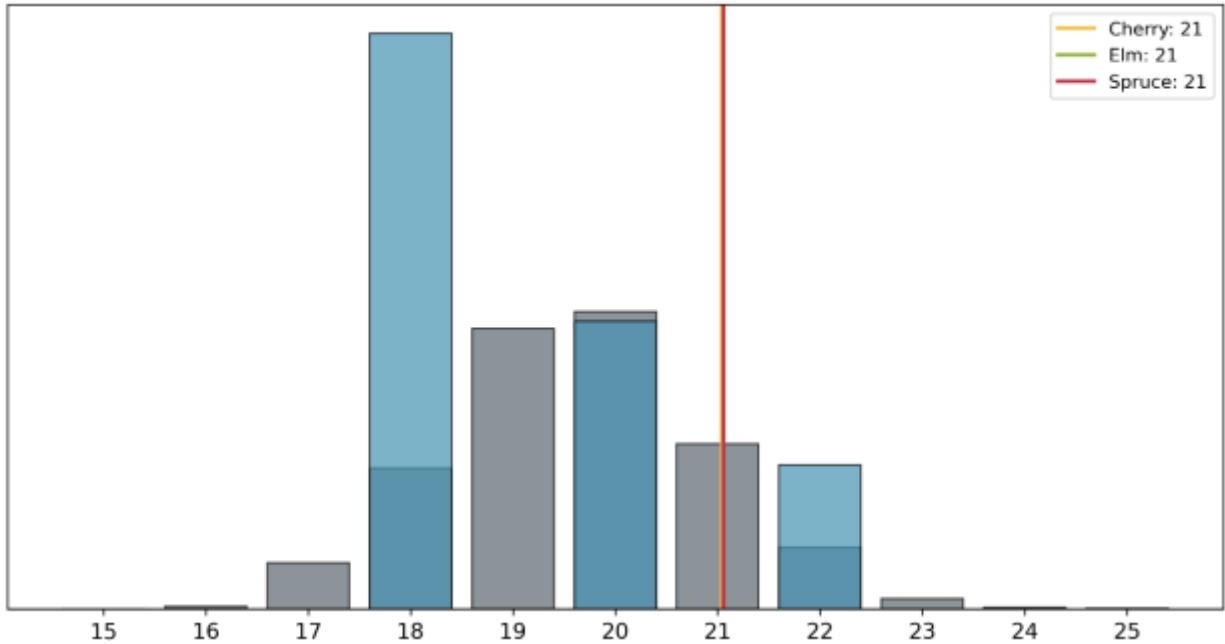

Figure 8. Number of Seats Democrats Would Win with Senate 2018 Results

Figure 8 illustrates outcomes under one particular election result. Under other election results in our sample, Democratic candidates win an additional seat under Plan Cherry.

Overall, all three plans are fair to parties. Their differences are small, and well within the range we would expect under typical maps that were not designed to favor or disfavor a party.

CRITERION E: FAIRNESS TO CANDIDATES

"Districts shall not favor or disfavor an incumbent elected official or a candidate."

Understanding the criterion

See the discussion under Section III.2.E on the analysis of the Congressional district maps, verbatim.

Measures of fairness to candidates

See the discussion under Section III.2.E on the analysis of the Congressional district maps. In addition, two considerations apply differently to candidates to the Michigan Senate.

The first is that, unlike Representatives to the US House, incumbent Michigan senators who have already served two terms are term-limited; placing a term-limited incumbent in the same district as another incumbent does not pose an advantage or disadvantage to any candidate.[37] We can also test whether two (or more) non-term limited incumbents are placed in the same new district, assessing whether non-term-limited incumbents are treated differently than term-limited incumbents.

The second is that, unlike Representatives to the US House, candidates for a seat in the Michigan Senate must be registered voters in the district they seek to represent.[38] Therefore, incumbents put in the same district cannot avoid facing each other simply by seeking to represent a different district.

Results

The analysis on double-bunking (placing two incumbents in the same new district) is underway, and not yet available.

On competitiveness, plans Spruce, Elm and Cherry each have exactly six "swing" districts that have been won at least once by each of the two parties in a statewide election in 2016 or 2018. This is the average number of such districts in the Computer Ensemble. See Figure 9.

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[37] Mich. Constitution, Article IV § 54.
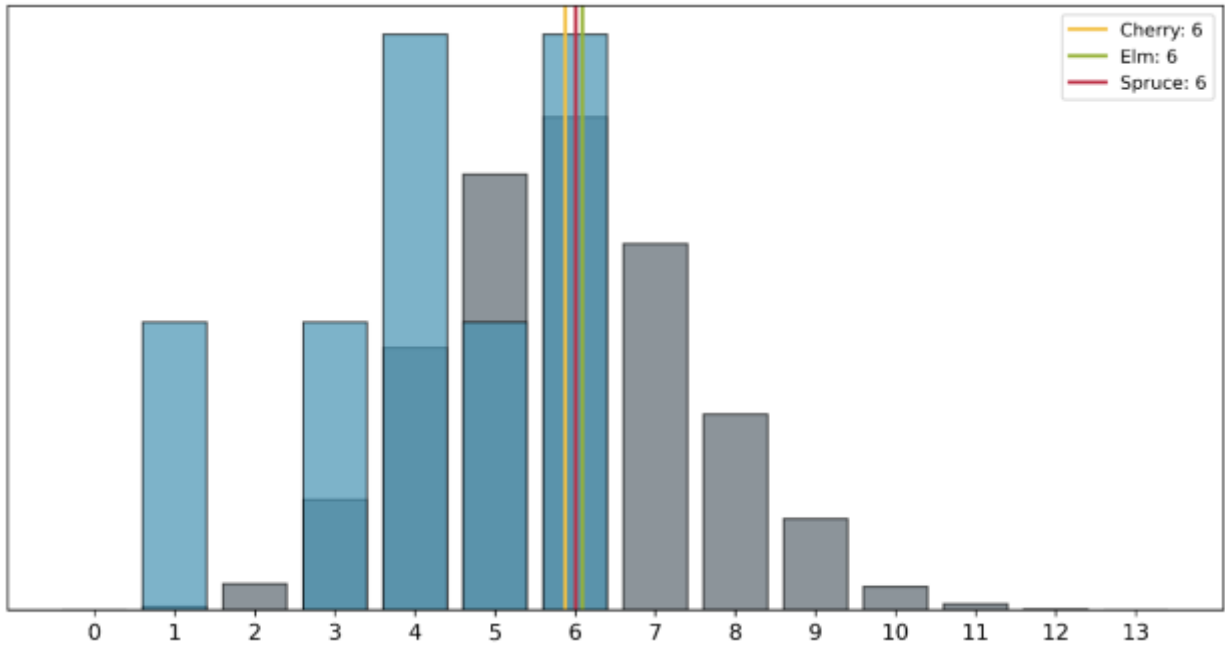[38] Mich. Constitution, Article IV § 7.

Figure 9. Number of Swing Senate Districts

CRITERION F: JURISDICTIONAL BOUNDARIES

"Districts shall reflect consideration of county, city, and township boundaries."

Understanding the criterion
See the discussion under Section III.2.F on the analysis of the Congressional district maps, verbatim.

Measures of respect of jurisdictional boundaries
See the discussion under Section III.2.F on the analysis of the Congressional district maps, verbatim.

Results
We present results on county splits. Results on city, town and township splits are underway and are not yet available.

TABLE 13. Split counties and County Splits in Senate Maps		
	Split Counties	Number of Pieces
Plan Spruce	21	73
Plan Elm	21	73
Plan Cherry	25	84

Plan Cherry features more splits than plans Spruce or Elm. The number of splits in Plan Spruce and Plan Elm is larger than average, but still typical of maps in the Computational Ensemble, whereas the high number of splits in Plan Cherry is an extreme outlier. These findings are illustrated in Figure 10. Note that the computer-generated plans are explicitly taking counties into consideration, so they succeed in limiting county splits more than the publicly-generated plans.
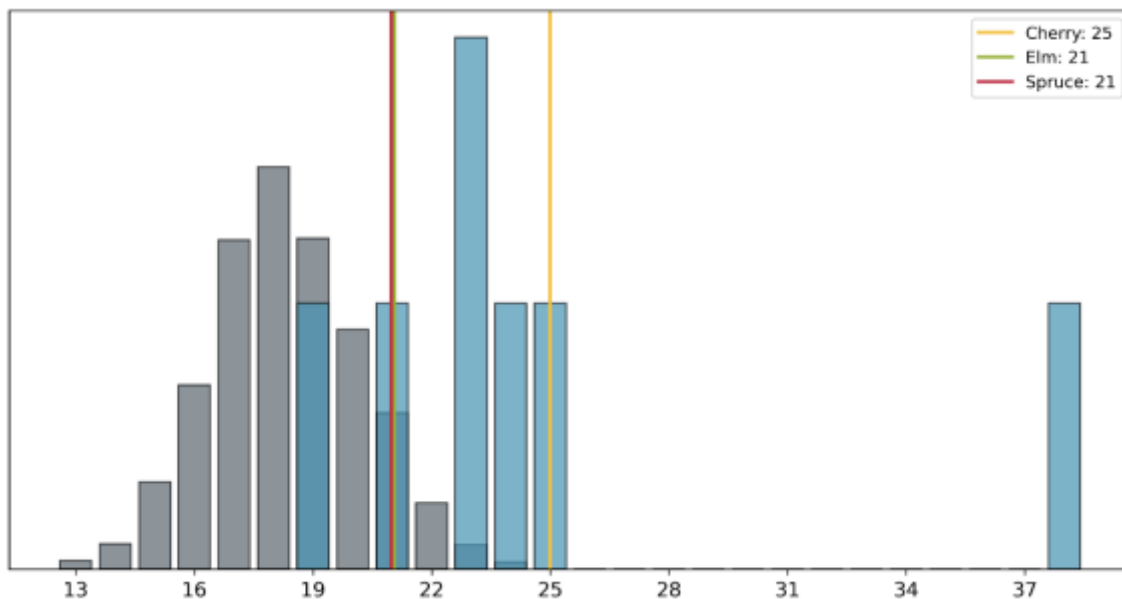

Figure 10. Split Counties in Senate Maps

CRITERION G: COMPACTNESS

"Districts shall be reasonably compact."

Understanding the criterion

See the discussion under Section III.2.F on the analysis of the Congressional district maps, verbatim.

Measures of compactness

See the discussion under Section III.2.F on the analysis of the Congressional district maps, verbatim.

Results

In the next table, for each redistricting plan in each row, we provide the Polsby-Popper, Reock and Cut Edges measures of compactness, respectively in columns 1, 2 and 3.

TABLE 14. Compactness measures in Senate district plans.			
	Polsby-Popper	Reock	Cut Edges
Plan Spruce	0.40	0.39	1338
Plan Elm	0.41	0.39	1330
Plan Cherry	0.39	0.38	1335
2011 Official Map	0.39	0.40	n.a.

All three of these plans are similarly and reasonably compact, more so than more than half in the computational ensemble, as illustrated by Figure 11.
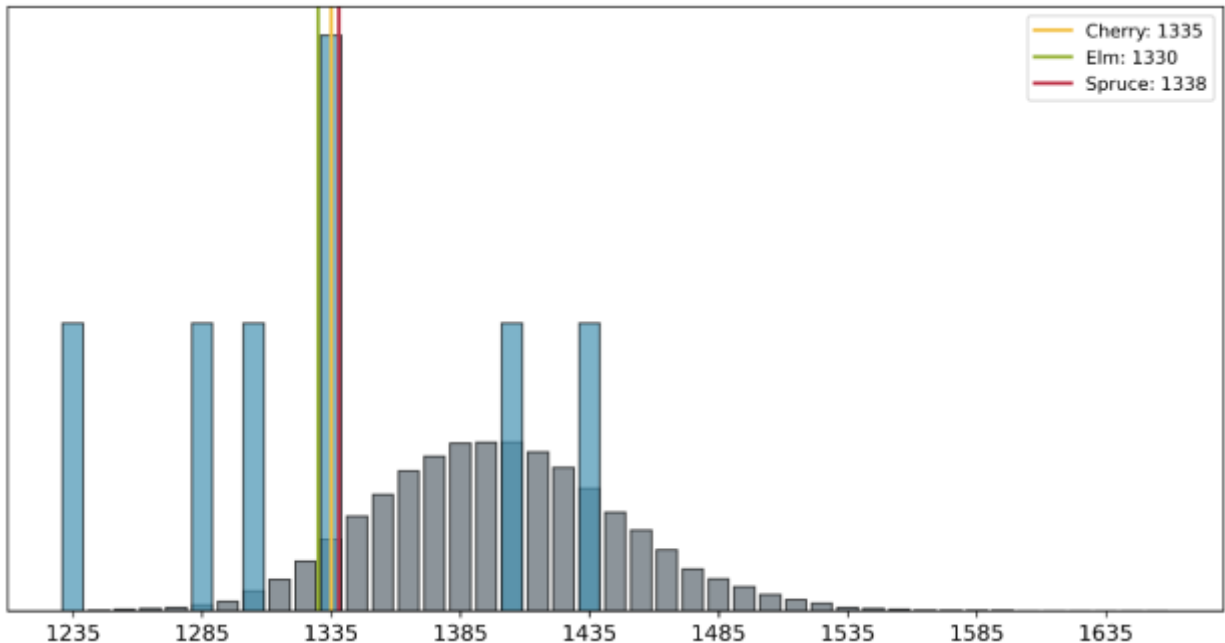

Figure 11. Number of Cut Edges in Senate District Plans.

IV.3. SUMMARY OF RESULTS

Plan Spruce appears to be the only complete Senate map. Plan Elm misses one U.S. Census block, with 13 residents unassigned to any district. Plan Cherry has a more major deficiency, leaving an entire precinct with more than 1,900 inhabitants unassigned to any district. These omissions are easy to fix. The omission in Plan Elm is easy to fix by assigning the omitted U.S. Census block to the district of adjacent blocks, which would not alter results in any meaningful way. The larger deficiency in Plan Cherry involves population close to 1% of that of a district, but the omitted precinct is surrounded by an underpopulated district that would remain underpopulated if this precinct were added to it. Therefore, Plan Cherry could be remedied as well by assigning the unassigned precinct to the district that surrounds it.

These three plans feature large deviations from population equality: more than 5% in all three plans, and more than 9% in Plan Spruce and Plan Elm.

All three of these plans feature three districts with more than 40% of their Voting Age Population identifying as "Black", and six with more than 35%, but none feature a district with a majority of the VAP identifying as "Black" (the previous plan featured two). This absence of majority-Black districts is their most striking feature. It is achieved by breaking apart the large concentration of Black voters in the City of Detroit and reconfiguring them in thin North-Sound strip districts (numbers 5, 6, 7 and 8) that radiate northbound beyond the city limits and across county boundaries into suburban and mostly non-Black Macomb and Oakland counties.

All three plans satisfy contiguity.

It is unclear how the districts in these plans — and in particular the cross-county North-South strip districts 5, 6, 7 and 8 — reflect Communities of Interest in the state of Michigan. Multiple small communities of Interest may be contained within these districts, even if they do not reflect county geography and did not request to be districted together, but they have not been fully specified.

All three plans perform well overall according to a collection of accepted measures of partisan fairness.[39] Plan Cherry is the most favorable to Democratic candidates, but the differences between the three plans are small, amounting to less than a seat on average.

While the exact boundaries vary, these three plans are very similar, offering variations on the same scheme, rather than three truly distinct plans.

These plans feature a standard number of seats that change hands across elections.

Plan Cherry fails to reflect consideration of county boundaries, while Plan Spruce and Plan Elm perform not as poorly in this regard. All three plans are compact.

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[39] The plans do not perform well on each individual measure. It is impossible to score well on all at the same time, as different measures have conflicting demands. We mean that, overall, taking their scores across all measures, the maps perform well on this criterion.

PL.   ANALYSIS OF PROPOSED DRAFT MAPS FOR MICHIGAN'S HOUSE DISTRICTS

V.1. THE PROPOSED DRAFT MICHIGAN HOUSE DISTRICT MAPS

The MICRC approved the following Proposed Draft maps for Michigan House of Representatives districts, for consideration in the Second Round of Public Hearings (Oct 20 – Oct 27, 2021): [40]

-Plan "Pine", name "10-08-21v1HD RAS" (number #227). Voted for publication 13-0.
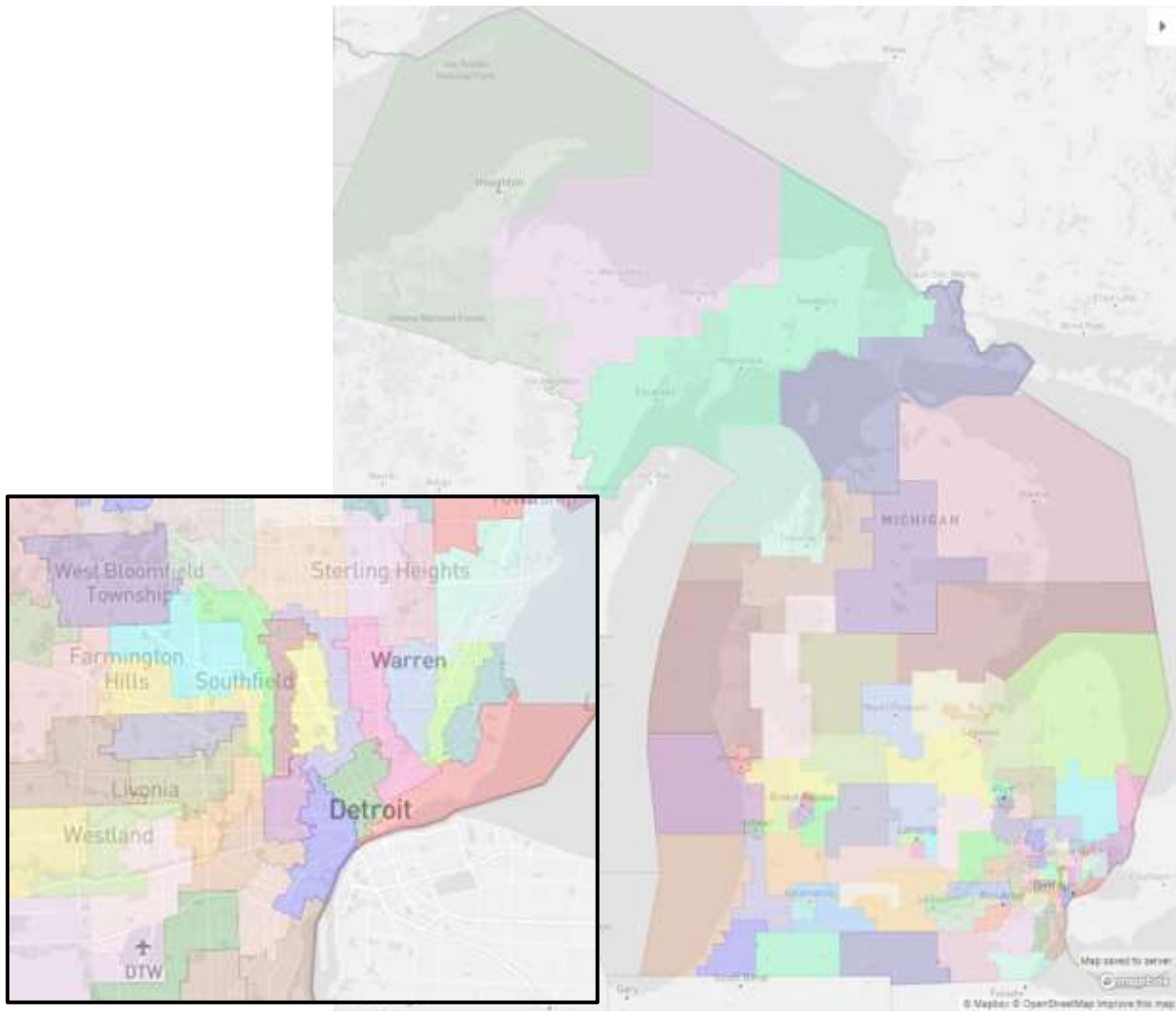

Plan Pine

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[40] These maps are available for download here:
https://michigan.mydistricting.com/legdistricting/michigan/comment_links

-Plan "Peach", name "10-08-21v2 HD" (number #228). Voted for publication 13-0.

Note that the Peach map does <u>not appear to be a valid redistricting plan</u>, as it fails to assign a district to all the areas of Michigan. Plan Peach fails to assign any district to a precinct with population 3,204 in the village of Blissfield (Lenawee County). This area — highlighted in red on the inset map below — must be assigned to a district.
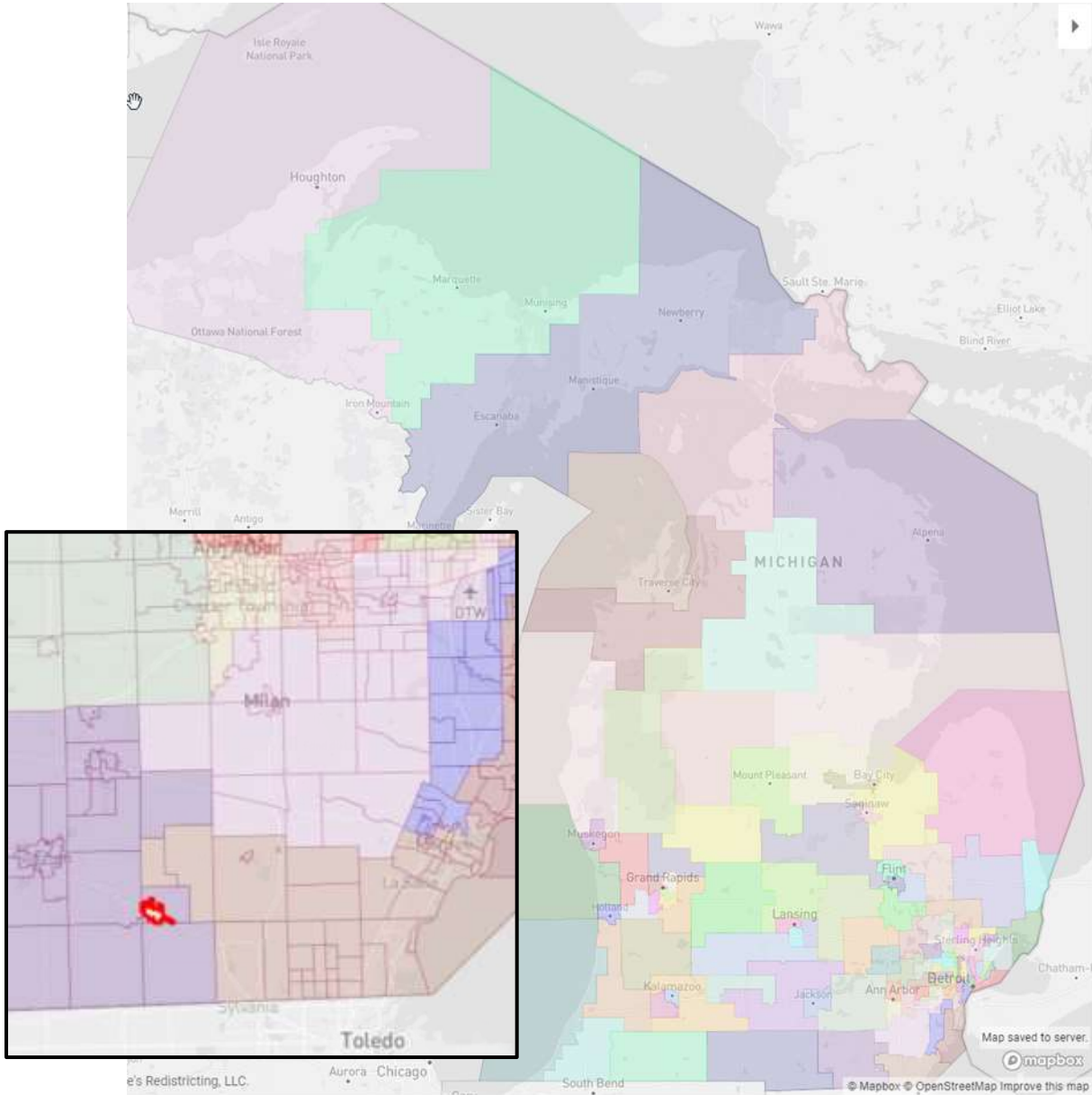
Plan Peach (incomplete)

-Plan "Oak", name "10-08-21v1HD" (number #229). Voted for publication 13-0.

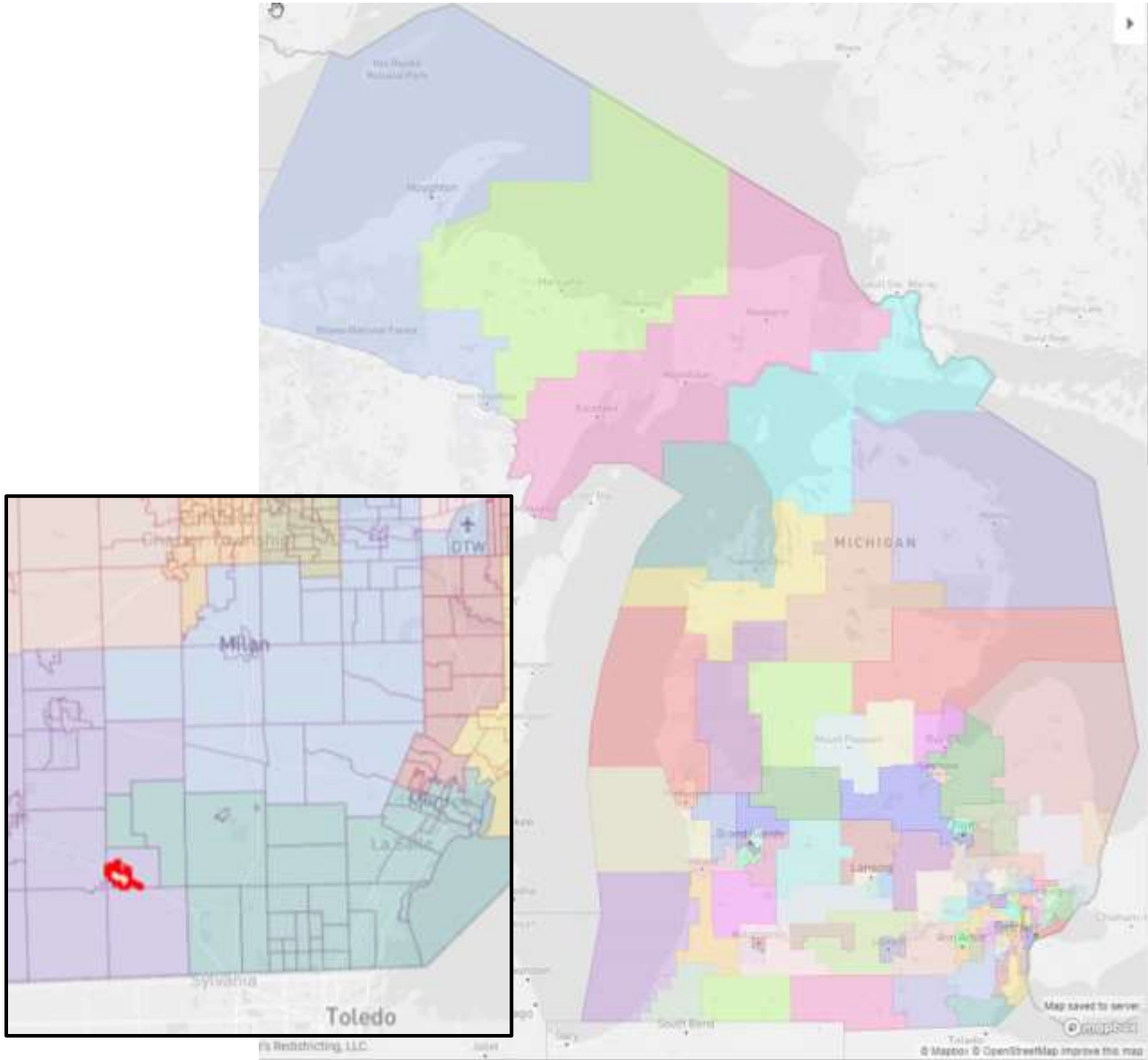Note that the Oak map does <u>not appear to be a valid redistricting plan</u>, as it fails to assign a district to all the areas of Michigan. Plan Oak fails to assign any district to a precinct with population 3,204 in the village of Blissfield (Lenawee County). This area —highlighted in red on the inset map below — must be assigned to a district.

Plan Oak (incomplete)

V.2. MEASURING PERFORMANCE ON EACH CRITERIA

CRITERION A: POPULATION BALANCE AND VOTING RIGHTS ACT

"Districts shall be of equal population as mandated by the United States constitution, and shall comply with the voting rights act and other federal laws."

Understanding the Criterion

The Michigan population according to the 2020 US Census is 10,077,331 inhabitants. Michigan has 110 districts for state house elections. So the ideal equal population is 91,612 inhabitants per district.

The U.S. Supreme Court has ruled that, solely on U.S. constitutional grounds, the population in state legislative districts must be roughly equal; however, "some deviations from the equal-population principle are constitutionally permissible," for a rational state interest, and in particular to respect jurisdictional boundaries of counties, cities and towns.[41] In particular, population differences of up to 10% between the least and most populous districts are "minor" and do not require "justification from the State."[42] Population deviations greater than 10% must be justified by the State, and instances with a deviation as large as 89% away from the ideal size have been deemed legitimate.[43]

If there is any substantial deviation from population equality, supporters of one party cannot be systematically placed in larger districts.[44]

With regard to the Voting Rights Act, we refer verbatim to the discussion of Criterion A under Section III.2. for the congressional maps.

Measures of performance on Criterion A

A1**. Measure of population inequality**
We compute the difference between the most and least populous district, using the formula:

$$\frac{Population\ of\ most\ populous\ district}{Population\ of\ least\ populous\ district} - 1,$$

in percentage points.
For convenience, we also report the largest deviation to the ideal population size of a district, namely,

$$\frac{Population\ of\ most\ populous\ district}{91,612} - 1,$$

again, in percentage points.

If the difference between the most and least populous district surpasses 1%, we also compare the average population of districts won by Democratic Party candidates to the average population

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[41] Reynolds v. Sims, 377 US 579-580.
[42] Brown v. Thomson, 462 US 842.
[43] Brown v. Thomson, 462 US 835.
[44] *Cox v. Larios*, 542 U.S. 947

of districts won by Republican Party candidates, in all U.S. Presidential or Michigan Senate elections from 2014 to 2020 (namely, the 2016 and 2020 Presidential elections, and the 2014 and 2018 Michigan Senate elections). This is a measure of partisan malapportionment.

A2. **Number of Districts of Opportunity**
As discussed in Section III.2.A2 with regard to the application of the Voting Rights Act to Congressional district maps, we seek to compute the number of districts of opportunity for ethnic and linguistic minorities. We can then compare this number to the proportion of minority population. For instance, the "Black Alone" population is 13.7% of the Michigan population (with a percentage as high as 37.6% in Wayne Co.), a statewide percentage that corresponds to fifteen Michigan House districts. Further, 5.6% of the Michigan population is Hispanic or Latino community, a percentage that corresponds to six Michigan House districts (though in this case the highest concentration by county is 15.4% in Oceana Co.); and 3.3% of the state population is Asian-American (with 9% in Washtenaw Co.), a percentage that corresponds to three or four Michigan House districts.

In addition, since a Michigan House district comprises only less than 92,000 inhabitants, a geographically concentrated ethnic or linguistic minority as small as 46,000 inhabitants (less than 0.5% of the state's population) can constitute a majority in a geographically compact district, being thus subject to consideration under the VRA.

We can also compare the number of opportunity districts for the black minority to the number of such opportunity districts in the previous redistricting plan. We refer to the report "Determining if a redistricting plan complies with the Voting Rights Act" by Dr. Lisa Handley, presented to the MICRC. If Dr. Handley's estimates are correct, any 40% Black district is a district of opportunity and will elect candidates preferred by the Black minority. We do not have any comparable estimate for Hispanic, Asian, or other minority districts of opportunity.

If Dr. Handley's estimate is correct for Black minority districts of opportunity, there were twelve (or up to 14 at the lower threshold of 35%) Black districts of opportunity in the previous redistricting plan.

We do not have such estimate for Hispanic, Asian, or other minority districts.

So the measure we report is:

-Number of districts with >50% of their voting age population identifying as Black.

-Number of districts with >40% of their voting age population identifying as Black.

-Number of districts with >35% of their voting age population identifying as Black.

We also report the number of districts, if any, with >40% or >35% of their voting age population identifying as some other ethnic or linguistic minority (in the previous redistricting plan, there were none).

Results
We present the results on Population Equality in the following table. Each row indicates a redistricting plan for MI House districts. The first column reports the population difference between the most and the least populated districts. The second column reports the maximum deviation from the ideal district population. And the third column reports the partisan malapportionment

measure, with a result bigger than zero meaning that districts won by Democrats have more population (which indicates an advantage to the Republican Party), and thus negative numbers indicating that districts won by Republicans have more population (which indicates an advantage to the Democratic Party).

TABLE 15. *Population Equality in House Plans*			
	Pop. difference	**Max. deviation**	**Partisan malapport.**
Plan Pine	7.20%	3.49%	-0.22%
Plan Peach [*]	8.36%	4.12%	-0.24%
Plan Oak [*]	8.83%	4.32%	-0.24%

[*] Note that Plan Peach and Plan Oak are not complete redistricting plans, as they fail to assign a district to each district. Results would change if these plans were remedied by assigning a district to each precinct.

As in the case of Senate maps, these deviations are within the range that is acceptable for state legislative districts under the U.S. Constitution, but they are not within the range of deviations that are potentially acceptable (if suitably justified) for congressional districts under the U.S. Constitution. If the explicit Population Equality clause under the Michigan Constitution were understood to be stricter than the population equality requirement implicit in the federal Equal Protection clause, then these deviations would be too large.

We report the number of districts in which more than 50%, more than 40%, and more than 35% of the Voting Age Population identifies as "Black" or "African-American" (alone) in the following table, as computed by the MGGG Lab for this report. These numbers serve as proxy for the number of Black-minority districts of opportunity.

TABLE 16. *Black Minority Districts of Opportunity in State House Draft Proposed Maps*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Pine	0	14	20
Plan Peach [*]	*0*	*14*	*20*
Plan Oak [*]	*0*	*14*	*20*
2011 Official Map	11	12	14
Proportional to Pop.	15		

As in the case of the congressional maps and Senate maps, the most striking result is that none of the 11 majority-minority districts in the previous plans survives in any of these three proposed plans. This is truly extraordinary. The following graph shows the Black share of the Voting Age Population in each district. Districts are ordered from lowest to highest Black share (that is, the labels in the horizontal axis are not the district number in the Plan; rather, they should be interpreted as lowest Black VAP share (1), 2nd lowest Black VAP share (2), all the way to the district with the highest Black VAP share (38). The colored dots represent each map. The boxes represent the typical Black VAP shares in maps in the Computational Ensemble, and the arms stretching out of the boxes represent the Black VAP share at the borderline extreme map such that only 2.5% of maps have shares above or below the range covered by the arms.
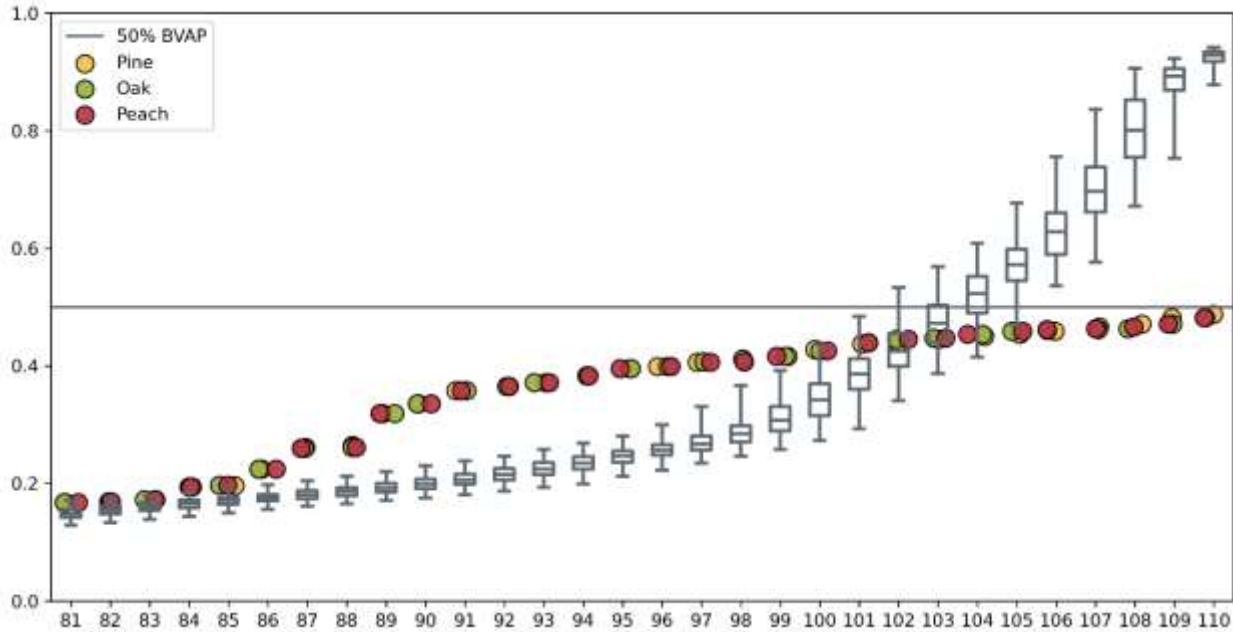
Figure 12. Distribution of Black VAP by House District

Almost all maps in the Computational Ensemble feature at least five Black-majority districts (most feature at least seven), including at least two with more than 80% Black VAP, and one more than 90% Black VAP. The 2011 redistricting map arguably packed Black voters around Metro Detroit so that the number of such Black-majority districts increased to eleven, higher than in almost any of the computational (race-blind) maps. These plans go in the opposite direction to an extraordinary extreme, arguably cracking the large majorities of Black voters to studiously avoid configuring a single district that would cross the 50% threshold of Black voters. By diluting the concentration of Black voters in the districts with greatest share of them, these plans manage to generate an improbably high number of districts with over 40% and over 35% of Black voters.

The wisdom, appropriateness, or legality of maximizing the number of districts with Black VAP population between 35% and 49.9% while avoiding any Black-majority district may be questionable, but these three plans clearly reflect the Commission's success in achieving such a goal.

We note that all three plans also contain one district with Hispanic share of VAP above 35%, but none above 40% (39.2% of the Voting Age Population in District 1 identifies as "Hispanic"). There was no such district in the 2011 map, but this falls short of the number proportional to the Hispanic population in the state (5).

No district contains a share of Asian VAP above 35%.

CRITERION B: CONTIGUITY

"Districts shall be geographically contiguous. Island areas are considered to be contiguous by land to the county of which they are a part."

Understanding the Criterion

See the discussion under Section III.2.B on the analysis of Congressional districts.

Measure of Contiguity

We report a binary "Yes" or "No" for whether a plan satisfies the stricter definition of contiguity, satisfying rook contiguity with islands attached to the land at the nearest point in the county of which they are a part of.

Results

We have not yet verified whether the draft proposed Michigan House maps satisfy contiguity. The Commission's Compliance Sheet does not state whether the maps comply with this criterion.

TABLE 17. *Contiguity*.	
	Are all districts contiguous?
Plan Pine	
Plan Peach	
Plan Oak	

CRITERION C: COMMUNITIES OF INTEREST

"Districts shall reflect the state's diverse population and communities of interest. Communities of interest may include, but shall not be limited to, populations that share cultural or historical characteristics or economic interests. Communities of interest do not include relationships with political parties, incumbents, or political candidates."

Understanding the Criterion
See the discussion under Section III.2.C on the analysis of Congressional district maps. The only relevant difference in the application of this criterion to the Michigan House districts district maps is that in order for a Community of Interest to be kept together in a single Senate district, it must be a community smaller than the size of such district, namely, no larger than approximately 92,000 inhabitants.

Measure of Respect for Communities of Interest
See the discussion under Section III.2.C on the analysis of Congressional district maps.

Results
The quantitative analysis on COI cluster splits is underway by the MGGG Lab and is not yet available.

CRITERION D: PARTISAN FAIRNESS

"Districts shall not provide a disproportionate advantage to any political party. A disproportionate advantage to a political party shall be determined using accepted measures of partisan fairness."

Understanding the Criterion
See the discussion under Section III.2.D on the analysis of the Congressional district maps, verbatim.

Measures of partisan fairness

D1. **Partisan Bias**

D2. **Efficiency Gap**

D3. **Deviations from proportionality**
Measures D1-D4 are exactly as described in Section III.2.D.

D4. **Median-Mean difference**
The median-mean is a measure of symmetry that captures how difficult it is for a party to obtain a majority of the delegation.[45] Suppose we order the districts from least to most Republican, by vote share in a previous election. The median-mean difference then compares the vote share in the average of the 55th and 56th most Republican districts (these two are the median districts in a map of 110 House districts) to the statewide vote-share (the mean). If this number is positive, then the party can win fifty-five seats (half of the Michigan House) even if it loses the vote statewide, and the magnitude of the median-mean difference shows by how much it can lose the statewide vote and still win fifty-five seats and come closer to winning the 56th than to losing the 55th.

This measure is more informative for state legislatures where winning the median district gives a party a majority.

D5. **Lopsided Test**
Exactly as described in Section III.2.D.

D6. **Partisan Advantage**
The Partisan Advantage is a measure of neutrality that computes how much the seat outcome deviates from a neutral benchmark based on the state's map of jurisdictions (counties, cities and towns). This benchmark is the seat outcome in which seats are assigned to jurisdictions in proportion to their population.[46] The list of jurisdictions we use to compute the neutral benchmark for the redistricting plan for the Michigan House is the following: the 72 counties with population no greater than two idea-sized House districts (183,224 inhabitants); the largest cities, towns and

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[45] McDonald, Michael D., and Robin E. Best. "Unfair partisan gerrymanders in politics and law: A diagnostic applied to six cases." *Election Law Journal* 14.4 (2015): 312-330.
[46] Jon X. Eguia. "A measure of partisan fairness in redistricting." *Election Law Journal*, forthcoming.

townships in the 11 counties with population greater than this threshold (Wayne, Oakland, Macomb, Kent, Genesee, Washtenaw, Ottawa, Ingham, Kalamazoo, Livingston, Saginaw and Muskegon), taking out from each county and adding to the list as many of the largest cities and towns as needed until the rest of the county has fewer than 183,224 residents; for each of these eleven largest counties, the "rest of county" (after its largest subcounty units have been taken out) is also included in the list of jurisdictions. For each jurisdiction in this list, the jurisdictional benchmark assigns seats in proportion to the population of the jurisdiction, to the party that won most votes in this jurisdiction. Aggregating by jurisdictions in this manner, the benchmark takes into account the geographic distribution of votes for each party across the state. The Partisan Advantage based on this jurisdictional benchmark is then the difference between the seats that a party obtains given the map, and the seats that it would obtain under this jurisdictional benchmark.

D7. **Outlier test**
Exactly as described in Section III.2.D.

D8. **Other measures**
The measures available in DRA 2020 are as described in subsection IV.2.D9 in the analysis of Senate district plans.

<div align="center">-   -   -</div>

The election data that we use to compute the measures in this Section is again:

The 2018 Governor election; the 2018 Secretary of State election; the 2018 Attorney General election; the 2016 Presidential election; and the 2018 US Senate election, are used by the MGGG lab to report results on Partisan Bias (D1), Efficiency Gap (D2), Deviations from Proportionality (D3), Median-Mean Difference (D4), and the Outlier test (D7). And the 2014, 2016, 2018 and 2020 Michigan House election, and the 2016 and 2020 U.S. Presidential election, are used by Dr. Christian Cox from Yale University to compute the Lopsided Margins (D5) and the Partisan Advantage (D6). DRA 2020 allows users to choose their preferred election data input to compute the measures described under D8.

Results
We present the results on partisan fairness across all Proposed Draft maps for Michigan House districts in the following table. Each row indicates a redistricting plan. Each column indicates a measure of partisan fairness, from D1 to D7. Positive numbers indicate deviations from the fair ideal that favor the Republican Party, and negative values indicate deviations that favor the Democratic Party. Zero indicates perfect fairness according to each measure. The values of some measures are in seats; others are in percentage of the total number of seats. The "Outlier" (D7) value indicates whether the map is more favorable to Republican candidates or to Democratic candidates than the median plan in the Computational Ensemble, and what share of maps favor this party less (so, for instance, "R 65%" would mean that a map is more favorable to the Republican Party than 65% of maps in the ensemble). Values above 95% indicate the map is an outlier. [Note: this measure is not yet available].

TABLE18. *Measures of Partisan Fairness for House District Plans*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Pine	+10.3%	+5.8%	+2.4 seats	+3.1%	+5.7%	-1.3 seats	
Plan Peach [*]	+10.9%	+6.4%	+3.3 seats	+4.1%	+5.8%	-0.9 seats	
Plan Oak [*]	+10.9%	+6.6%	+3.5 seats	+4.2%	+5.9%	-0.8 seats	

Compare these results to the results on the measures of partisan fairness used by the Commission, as advised by Dr. Lisa Handley, displayed in the table below. The values below were obtained from a composite of all 13 state-wide elections (Presidential, US Senate, Governor, Secretary of State, and State Attorney) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 19. *Selection of Measures of Partisan Fairness Used by the Commission.*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Pine	--	+5.7%	+1.4%	+2.7%	+5.8%	--	--
Plan Peach [*]	--	+6.4%	+2.3%	+3.4%	+6.3%	--	--
Plan Oak [*]	--	+8.4%	+3.2%	+3.8%	+6.8%	--	--

 [*] Recall that Plan Peach and Plan Oak are not complete redistricting plans, as they fail to assign a district to each district. Results would change if these plans were remedied by assigning a district to each precinct.

The pattern is similar to the one we identified in Congressional and Senate maps, but the Republican political geography is more pronounced at the level of House legislative districts. For instance, the average map in the Computational Ensemble feature an Efficiency Gap of about 7%. Confronted with this large Republican advantage in the geographic distribution of its voters, the Commission's plans seem to have taken a deliberate but modest step toward tilting the maps toward the Democratic Party, in order to partially — but only partially — cancel out the underlying Republican geographic advantage a little bit. This is reflected in the negative value of the Partisan Advantage (D6), which suggests that, net of the effect of political geography, the maps favor Democratic candidates a little bit (by about one seat), but nowhere near enough to compensate for the large underlying Republican advantage due to the political geography of the state.

This same effect is perhaps best illustrated by Figure 13. The Democratic candidate (J. Benson) won the 2018 Secretary of State election with an 8.9% vote margin. Across all states, parties and elections, an 8.9% vote margin typically translates to about a 17%-18% seat margin, which would be about 65 seats. But Michigan House elections don't work that way, and even with such a hefty margin, under a typical map, Democratic candidates would only win 60 or 61 seats. Plan Oak and Plan Peach would give the Democratic Party an extra seat, up to 62, and Plan Pine yet another one, up to 63. But all three plans stay within the range of normal outcomes, none stepping out into the extremes to aid any party.

Compared to other maps, these maps are fair, tilting outcomes slightly, but only slightly, in the direction of outcomes that are more symmetric for the two main parties.
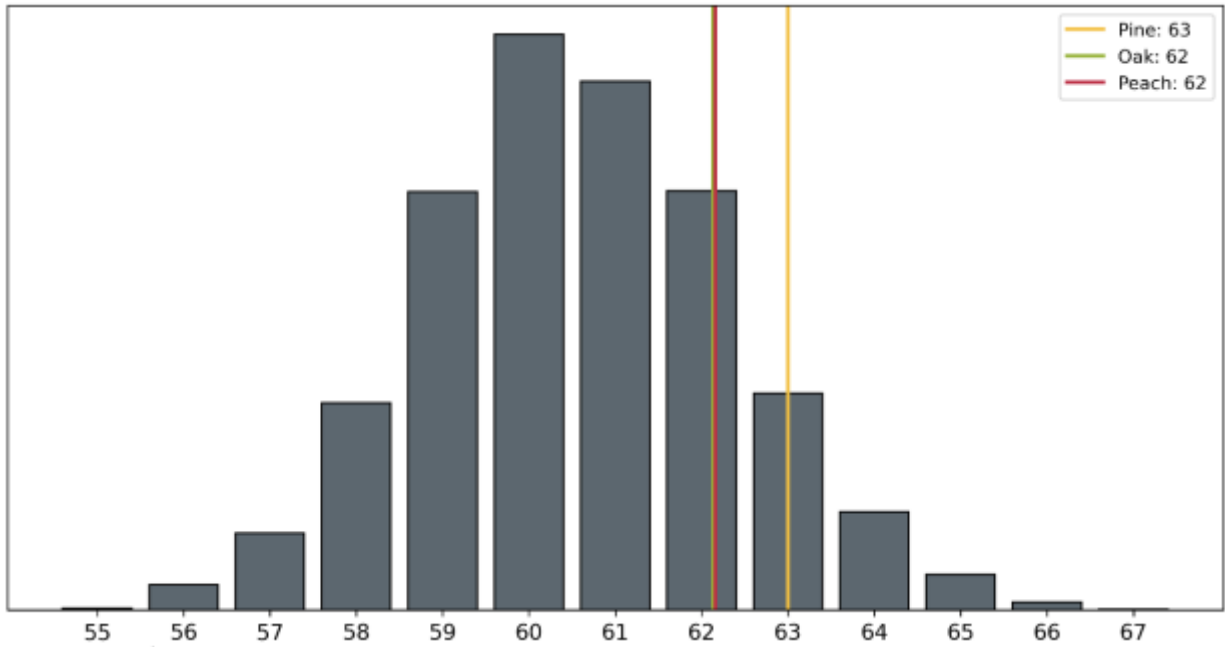
Figure 13. Number of Seats Democrats Would Win with 2018 SoS Results

CRITERION E: FAIRNESS TO CANDIDATES

"Districts shall not favor or disfavor an incumbent elected official or a candidate."

Understanding the criterion
See the discussion under Section III.2.E on the analysis of the Congressional district maps, verbatim.

Measures of fairness to candidates
See the discussion under Section IIII.2.E on the analysis of the Senate district maps.

Results
The analysis on double-bunking (placing two incumbents in the same new district) is underway, and not yet available.

On competitiveness, plans Pine, Peach and Oak each have exactly 20 "swing" districts that have been won at least once by each of the two parties in a statewide election in 2016 or 2018. This is close to the average number of such districts in the Computer Ensemble. See Figure 14.
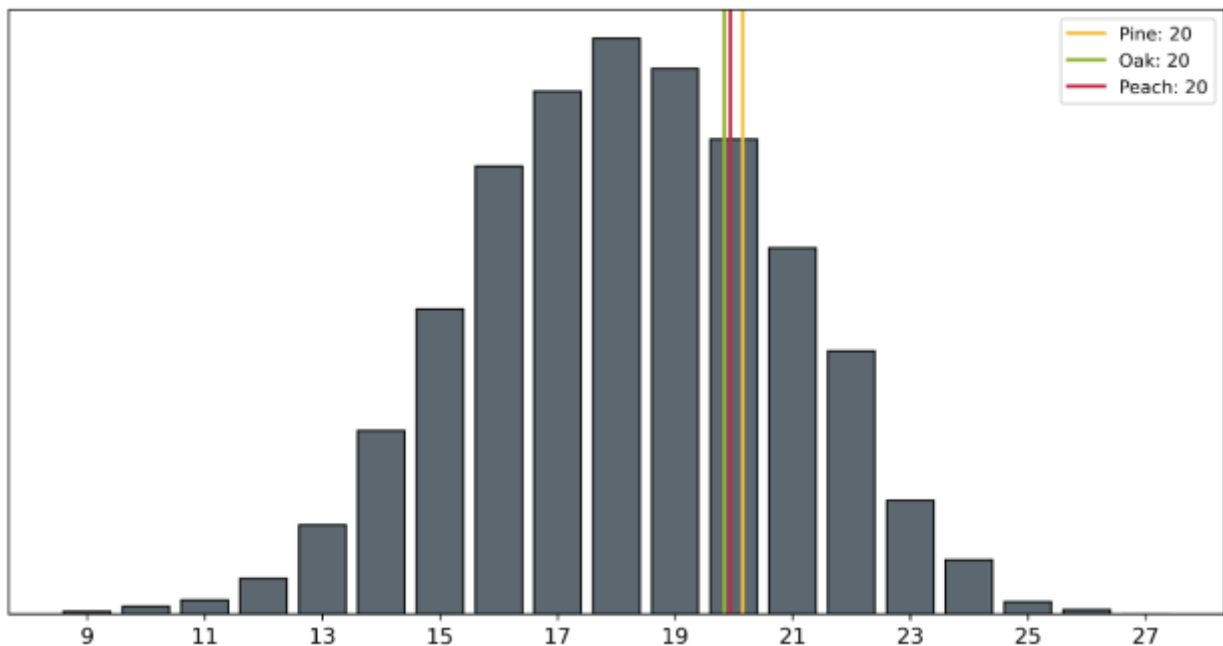

Figure 14. Number of Swing House Districts

CRITERION F: JURISDICTIONAL BOUNDARIES

"Districts shall reflect consideration of county, city, and township boundaries."

Understanding the criterion
See the discussion under Section III.2.F on the analysis of the Congressional district maps, verbatim.

Measures of respect of jurisdictional boundaries
See the discussion under Section III.2.F on the analysis of the Congressional district maps, verbatim.

Results
We present results on county splits, as computed by the MGGG Lab for this report. Results on city, town and township splits are underway and are not yet available.

TABLE 20. Split counties, and county splits in Senate maps		
	Split Counties	Number of Pieces
Plan Pine	47	202
Plan Peach	47	201
Plan Oak	46	199

The number of splits counties is large in all three maps, especially compared to the computer-generated maps that explicitly minimize split counties.

CRITERION G: COMPACTNESS

"Districts shall be reasonably compact."

Understanding the criterion
See the discussion under Section III.2.G on the analysis of the Congressional district maps, verbatim.

Measures of compactness
See the discussion under Section III.2.G on the analysis of the Congressional district maps, verbatim.

Results
In the next table, for each redistricting plan in each row, provide the Polsby-Popper, Reock and Cut Edges measures of compactness, respectively in columns 1, 2 and 3. The Polsby-Popper and Reock scores areas reported by the Princeton Gerrymandering Project Redistricting Report Cards for Michigan maps, and the Cut Edges is as computed by the MGGG Lab.

TABLE 21. Compactness Measures in House District Plans			
	Polsby-Popper	Reock	Cut Edges
Plan Pine	0.36	0.41	2644
Plan Peach [*]	0.37	0.41	2600
Plan Oak [*]	0.38	0.42	2579

The Cut Edges scores are poor, at the extreme high (bad) end of the distribution of the Computational Ensemble.
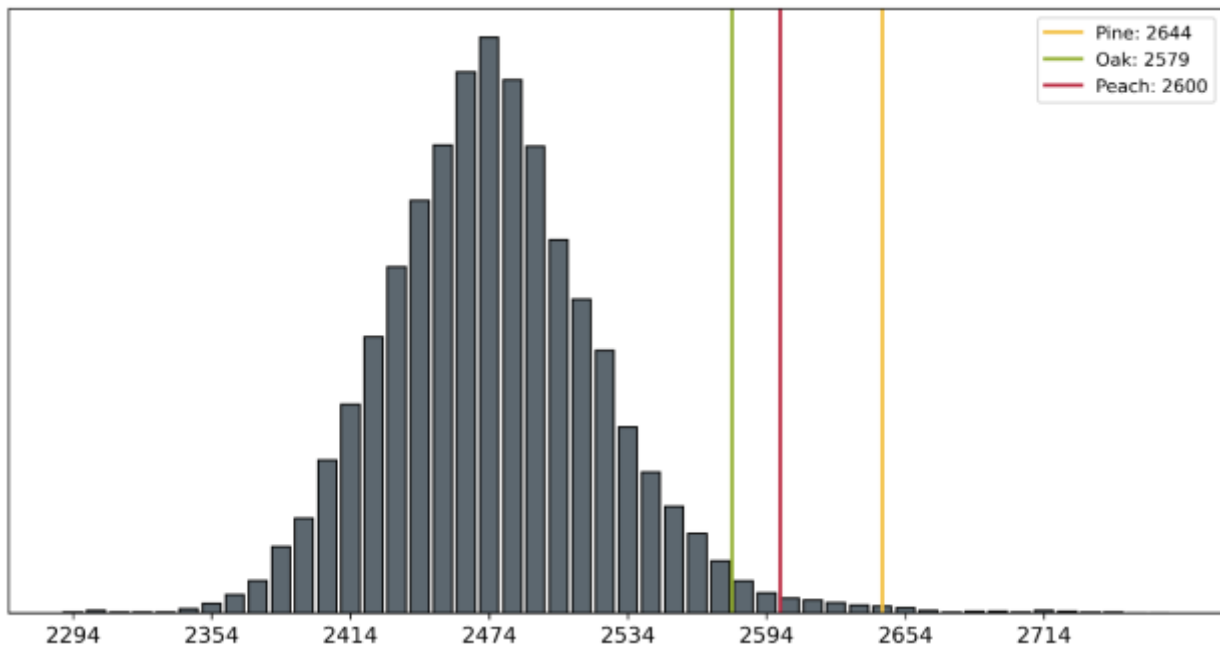

Figure 16. Number of Cut Edges in House District Plans.

Viewers can confirm, by visual inspection, that compactness was not a guiding factor in the design of these maps. The elongated, serrated, tool-like or key-like shapes of the North-South, cross-city, cross-country districts (such as 8, 16 or 21 in all three plans) respond to the racially motivated design of splitting the Black community in the City of Detroit so that no district be majority-Black. Districts 71 and 74 (again in all three maps) near Battle Creek are intertwined in each other's arms, and 71 straddles four counties. Such examples abound, and when aggregated and quantified, they lead to the extremely non-compact result illustrated by Figure 16, which dovetails with the extremely high number of county splits.

V.3. SUMMARY OF RESULTS

Plans Pine is the only complete House map. Plan Peach and Plan Oak leave a precinct with 3,204 inhabitants in the town of Blissfield (Lenawee County) unassigned to any district. This is a major omission, representing more than 3% of the population of a House district. These omissions are fixable. The precinct could be assigned to the district surrounding it, but doing so would increase the population of the district beyond the ideal population, inviting perhaps further adjustments to the map.

These three plans feature large deviations from population equality: more than 7% in all three plans.

All three of these plans feature 14 districts with more than 40% of their Voting Age Population identifying as "Black", and an additional six with more than 35%, but none feature a district with a majority of the VAP identifying as "Black" (the previous plan featured two). This absence of majority-Black districts is extraordinary, and impossible to arise except by careful design. It is achieved by breaking apart the large concentration of Black voters in the City of Detroit, and reconfiguring them in thin strip districts that radiate outward, across city lines and across county lines.

It is unclear how the districts in these plans — in particular the thin cross-county strip districts and the non-compact earmuff districts — reflect Communities of Interest in the state of Michigan.

All three plans perform well overall according to a collection of accepted measures of partisan fairness.[47] Plan Pine is the most favorable to Democratic candidates, but the differences between the three plans are small, amounting to less than a seat on average.

While the exact boundaries vary, these three plans are very similar, offering variations on the same scheme, rather than three truly distinct plans.

These plans feature a standard number of seats that change hands across elections.

They all three fail to reflect consideration of county boundaries, and contain numerous districts that are not reasonably compact.

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[47] The plans do not perform well on each individual measure. It is impossible to score well on all at the same time, as different measures have conflicting demands. We mean that, overall, taking their scores across all measures, the maps perform well on this criterion.

PART VI. EVALUATING MICHIGAN'S NEW PROCESS

As we write this report, we look to the start of Michigan's next election cycle – midterm elections that take place Tuesday, Nov. 8, 2022. Yet in reality, they are already underway. Michigan's primary for statewide candidates takes place Tuesday, Aug. 2, 2022. Even now, candidates are sharpening their campaign tools, anxious to know the boundaries that will govern their election success – or loss.

No one could predict that a novel Coronavirus, named COVID-19, would entangle presidential politics at its first strike and persist as decennial U.S. Census data were gathered and as Michigan's Independent Citizens Redistricting Commission was empaneled to draw voting boundaries. The Commission faced immediate lawsuits and complaints related to its formation and then was unable to meet its initial deadlines due to the Census delay and unable to get full legal certainty regarding its amended processes. Ultimately, the COVID-19 pandemic and other issues forced significant delays in release of the 2020 Census data, which in turn delayed the MICRC's ability to begin drawing maps, and stretched its timeline for release of final maps.

Under the new constitutional amendment, Michigan's Secretary of State would set the stage for redistricting under the MICRC. From October 24, 2019 to June 1, 2020, the Secretary of State invited Michigan citizens to apply to serve on the MICRC. Some 9,367 applications were processed, 55% male and 45% female. Sixty-one percent of them were over the age of 55. More than 48 percent of the applicants identified themselves as not affiliated with any political party, 38.5 percent of them identified as Democrats and 13 percent as Republican.

Between June and August, the Secretary of State completed the process to randomly draw commissioners from eligible applicants, a three-step process. The MICRC convened September 17-18, 2020, on a fast track to draw legally defensible boundaries governing a decade of citizen voting.

A website was designed, executive director and staff hired and a structure put in place for educating commissioners, inviting public input, hosting a series of public hearings, asking members of the public to draw maps of their own design and submit them through a special online portal. The website included space for preliminary maps as they were drawn and also for housing final maps. Legal resources were also engendered, expecting court battles to come.

After hiring its staff and preparing for public input, the Commission began gathering that input through the online portal and a series of sixteen public hearings around the state in May and June 2021. By late August, the MICRC began to draw draft maps. However, the Commission's early map drawing efforts were significantly influenced by delays in data access and related challenges, including data for the U.S. Census, partisanship, racial voting patterns, and Communities of Interest (COI). Each of these types of data have direct relevance to the criteria the Commission must utilize in drawing maps, making data challenges a key factor in the MICRC's early mapping efforts.

While waiting for the U.S. Census data to arrive, the MICRC made a number of decisions to help guide pending map drawing efforts. In one particularly important decision, the MICRC decided to

begin its efforts with a "blank" slate, rather than relying on either Michigan's 2010 maps or the hometowns of incumbent Michigan politicians.

The Commission also considered and agreed on a set of regional definitions, dividing that blank slate into manageable geographic areas in hopes of helping to organize and rationalize their mapping approach.

By August 19, 2021, the MICRC had debated and adopted a detailed [mapping process](#) to guide their pending efforts. The process included a flowchart detailing district design steps, a regional approach, steps to review proposed Communities of Interest, opportunities for individual commissioner-drafted mapping as well as a collaborative drawing approach, the handling of alternative maps, documentation and record keeping, and a structured approach to designing decisions.

After the 2020 Census Redistricting Data Summary File was released on August 12, the Commission's mapping consultant, Electronic Data Services, needed a few days to integrate the data into its GIS systems. At this point the MICRC did not yet have advice from its Voting Rights Act (VRA) consultant or VRA legal counsel—Dr. Lisa Handley and Bruce Adelson, respectively— on whether Michigan's new maps would need to protect minority voting rights according to the VRA, as was required of the 2010 maps. This information was provided for the first time at the Commission's meeting in Ann Arbor on September 2. Nor did it yet have COI data integrated into the GIS mapping system, which became available on September 1, or information to help understand how their line drawing would impact measures of partisan fairness.

Thus, when it was finally able to begin drawing maps on August 20,2021, the MICRC focused primarily on equal population, geographic contiguity, and jurisdiction boundaries, without significant regard to the other criteria. The Commission began by drawing Michigan Senate districts in their previously defined south-central and southeast Michigan regions. One of the newly proposed Senate maps was the first released.

As it began mapping, the Commission settled on a round-robin process whereby each commissioner took a turn designing districts, with the statewide map constructed in a stepwise progression moving from one commissioner to the next. During any commissioner's turn, all other commissioners were generally able to provide feedback and suggestions in real-time.

While the Commission began the map drawing with state senate districts, it quickly followed with Michigan House districts in the same region. Since most of the state's Congressional Districts necessarily cover larger geographic areas, the Commission postponed any focus on congressional seats until later in September.

As this map drawing process proceeded, the Commission continued to assess public input, made numerous modifications to previously designed districts, moved into additional regions of the state to continue drafting districts, and began to create additional sets of maps to address the variety of public input they had received. At times, the Commission chose to try to adhere to general public requests that were not associated with specific criteria, such as citizen views on how to split sections of the state or which areas should not be connected in the same district.

While most of the early focus was on equal population, geographic contiguity, and jurisdiction boundaries, commissioners also attempted to incorporate at least some Community of Interest

(COI) input early in the process. Much of this was based initially on jurisdictional relationships, reflecting public input from the first round of public hearings. For instance, the commissioners recalled substantial input on broad COI concepts such as keeping lakeshore communities together, and in many cases keeping urban and rural areas separate from one another, or about other regional relationships such as joining areas of a particular county with parts of a neighboring county due to cultural, economic, historic, and other relationships.

By August 26,2021, the Commission had received initial maps of COI clusters, prepared by the MGGG group, and began using these as overlays in the GIS system on September 1. As the Commission spent more time considering Communities of Interest, it encountered a difficult learning curve to efficiently and effectively consider the hundreds of submissions it had gathered, and how those submissions interact with each other and with other criteria such as equal population and compactness. These challenges began with consideration of COIs in the Upper Peninsula and northern Lower Peninsula, including tribal communities, lakeshore communities, and rural communities, but over time broadened as the Commission attempted to consider many additional COIs. After trying a few different approaches, including full MICRC consideration during meetings for every COI submission, not just the COI clusters, by early September the Commission decided their approach was taking too much time. They decided instead to have each of the commissioners' review COI information on their own, outside of meetings, and to bring that knowledge to bear while jointly designing maps during their meetings.

Through September 2021, numerous commissioners used their own laptop computers to analyze the available data and draft alternative versions of districts, to examine options and inform the full Commission's discussion.

By early September 2021, the Commission ended the regional approach and focused on completing initial versions of the Michigan Senate maps. After many revisions, this was accomplished on September 15. The Commission then quickly turned to drafting Michigan's U.S. Congressional Districts, completing initial versions of statewide maps in just days, before turning back to Michigan state House maps again on September 20.

The Commission's mapping process through this initial set of draft maps featured significant collaboration, much discussion of input from their consultants and the public, and many rounds of revisions. We note that MICRC tried to respond to its criteria but often did so with incomplete data. It also went beyond its requirements in incorporating public feedback in an effort to be responsive.

To test Michigan's attitudes and opinions about this historic undertaking – more in the public light than past redistricting efforts, Michigan State University's Institute for Public Policy and Social Research added questions about the MICRC to its September 2021 State of the State Survey. These questions were also asked in the Michigan Policy Insiders Panel, a group of legislative and executive staff and others that work in and around Michigan government.

Michigan's citizens expressed a range of opinions about the MICRC. Among them:

- Though around 4% more respondents indicated they were familiar with the MICRC than respondents in the same poll during the previous spring, more than half of respondents are still unfamiliar or have never heard of the Commission. Only 35.9% of respondents have seen or heard about the progress the Commission has made. In contrast, 91.5% of the policy insiders panel were very aware of the Commission. Much of the public said they

were moderately familiar with the Commission, either somewhat familiar (29%) or mostly unfamiliar (26%).

- Of those who have heard of the MICRC, opinions are generally positive. In the fall survey, 53.4% of those responding said that they believe that requiring districts to be drawn by an independent citizen's commission is better than the prior alternative. This figure is up 7.7% from the earlier survey. However, 17.1% of respondents, an increase of 2.6% higher than the earlier survey, said they considered the new redistricting process somewhat or significantly worse than Michigan's earlier redistricting efforts. What is evident is that people are making up their mind and engaging with the Commission, as 7.2% more respondents had an opinion on utilizing a Commission rather than leaving redistricting to the legislature. But still 43% of the Michigan public said they had no positive or negative opinion of the Commission and another 17% said they did not know. In the future, 78.4% say they will pay close or some attention to the commission, while only 8.2% won't pay attention at all. Policy insiders had a comparatively more positive view about the Commission with 51% showing approval. They were also more opinionated, with only 14% having no opinion and 3% saying they did not know.

- Respondents, those close and outside the capital, are, by and large, happy with the process and rules governing the commission. They indicated that it's important that commission members were randomly selected, represent all political parties, and that the Commission conduct 10 public hearings. Around 20% of respondents are interested in sending questions or even attending one of these public hearings. Most will at least engage with the media surrounding the Commission, with 60.1% indicating they will do so. However, though respondents thought it was important that the Commission is transparent and holds public hearings, only 40.6% believe that participating in one of these meetings will have an impact on the Commission's work. Among insiders, 70.5% of those responding believed that engaging in the public portion of the MICRC meetings will have no impact on the Commission's work.

- The public and policy insiders largely agreed that most aspects of the commission's design were important, rating its criteria and structure highly. Policy insiders were less positive about the importance of taking or following public input.

- To date, redistricting has been seen as more of an insider topic, one that attracted policy and media following. But as more of these Commissions have emerged across the country, the issue of gerrymandering has permeated the public's conscious. Michiganders like the idea of the MICRC, but aren't as confident that public input will matter or that will be likely to venture to engage in one of its public hearings.

We also asked both the Michigan public and Michigan policy insiders open-ended questions about what they had heard about the commission, why they had a positive or negative opinion, and what changes they expected from the Commission.

Among Michigan citizens, one of the most common things they reported hearing was that independent members of the commission were actually partisans. One response stated "[two] independents are really Democrats." Another stated that "I recently learned that one of the "independents" really isn't independent; he has always voted for one party's candidates and initiatives, instead of having a mix over the years."

Another common negative response was that the redistricting commission had accomplished little or had many disagreements. One individual stated "they cannot agree on the maps that need to be drawn and will not finish on time. They can't agree in general."

Positive responses included that the redistricting commission will prevent gerrymandering and bring about more fairness in districting and elections. One person said they heard "that it's supposed to make things more fair and cut down on gerrymandering." Some individuals said the redistricting commission would fix gerrymandering, often pointing to prior efforts by Republicans.

Another common response indicated that individuals believed that it was best to have an independent redistricting commission to draw districts without the input or influence of politicians or parties. One person said "It's important for our districts to be identified by an impartial commission rather than the legislators who have a clear stake in the decision."

Overall, many citizens mentioned that they expected the Commission to bring more fairness in elections and districts. One person said "I hope that it's a more fair system. One where voters choose their legislators, not the other way around." Another common answer indicated that many people expected no change to come from the redistricting commission. Several responses were just simply the word "nothing" or "none."

Among Lansing political insiders who work professionally in state politics, when asked "what have you heard?", many responded that the commission was moving slowly and failing to meet deadlines. One individual said the commission "moves too slowly. Not particularly competent. But may be best way to draw districts. At least transparent and balanced." Another political elite stated they "Read about in the media. Sounds like a bunch of people that have no clue performing a duty they know nothing about. Sounds like there will be a ton of legal challenges."

Many political insiders believed that the standards set to become a commissioner encouraged underqualified individuals to become commissioners. One person said "In what other line of work, are people hired by people who don't know what or understand the job is, based on the qualification that the people they get to hire are also the least qualified people to do the job?" Several also mentioned they had heard that many of the commissioners were repeatedly absent from meetings. One person said "People keep resigning or not showing up to the meetings that were appointed to the commission"

On the positive side, many political elites said they believed the process was fairer and would help to eliminate gerrymandering, much like the public. One stated "lines should be drawn in a fairer way. It would eliminate gerrymandering."

Another common answer praised the redistricting commission for its transparency in the redistricting process. One person stated "generally the committee is operating transparently and making an effort to achieve appropriate districts. Some challenges are evident, but the public knowledge of the problems indicates the openness of the process."

Overall, political elites commonly said they hope the Commission brings more fairness in elections and less gerrymandering. One expected a "reduction in gerrymandering and more equitable districts based on county, city, townships, etc. As a politician, it is your job to listen to ALL of your constituents and not be able to cherry pick certain geographic areas, because they fit the kind of constituency you desire."

PART VII. RECOMMENDATIONS

In light of our assessment of the new redistricting process so far, and our quantitative analysis of each of the Draft Proposed Maps, we issue a number of suggestions for consideration by the Commission as the redistricting process moves to a 2nd Round of Public Hearings and deliberations and toward a vote on proposed plans on November 5.

We stress that these are not final recommendations on the entirety of the redistricting process. Rather, we restrict our suggestions to recommendations that are actionable at this stage of the process -- before the proposed plans are announced on November 5 and prior to adopting the official redistricting plans for 2022-2031. We postpone a more comprehensive review of the entire redistricting process, with broader recommendations for 2030, to a Final Evaluative Report that we will conduct in 2022. These are our five recommendations for immediate consideration:

1. Six of the 10 Draft Proposed plans appear to be incomplete, leaving some (small) populated geographic areas of Michigan unassigned to any district. While the size of the population excluded from any district is small —ranging from 13 inhabitants in one instance, to a maximum of 3,204 inhabitants without a district in two plans — it is imperative that these omissions be remedied. Further, any Proposed Plan must assign every geographic area to a district, and the MICRC should check that any plan satisfies this essential requisite before publishing it as a Proposed Plan. Further, the following discrepancies between total population assigned to districts (according to the MICRC's compliance sheet), and the total population in Michigan according to the 2020 Census, must be resolved and brought to zero for any Draft Proposed Map that advances to Proposed Map.

Type of District	Codename	Total Pop. in all districts	Total Pop. in Michigan	Discrepancy
Congressional	Apple	10,077,331	10,077,331	0
Congressional	Birch	10,077,306	10,077,331	-25
Congressional	Maple	10,077,331	10,077,331	0
Congressional	Juniper	10,077,317	10,077,331	-14
State Senate	Elm	10,080,132	10,077,331	2,801
State Senate	Cherry	10,075,385	10,077,331	-1,946
State Senate	Spruce	10,079,459	10,077,331	2,128
State House	Peach	10,074,127	10,077,331	-3,204
State House	Oak	10,075,381	10,077,331	-1,950
State House	Pine	10,077,356	10,077,331	25

Deficits in the Birch, Juniper, Cherry and Peach plans can be fully accounted by the unassigned census blocks (or parts thereof). Once these are assigned, the discrepancies will vanish to zero. Surpluses in the Elm and Spruce plans are harder to account for and raise questions about the quality of the data in the compliance sheet.

2. The population deviations from perfect equality may need justification. The population deviation in congressional maps is small. We recommend that in announcing a Proposed Plan, the Commission articulate in writing which appropriate state interest (such as better complying with any of the seven criteria) justifies maintaining the small population deviations across congressional districts. The population deviation in state legislative maps for the Michigan Senate and Michigan House are large, and they require further justification. It may be prudent to adjust these maps to reduce the population deviation across districts to levels closer to those in the congressional maps.

3. The Draft plans pursue an unusual path to seek compliance with the VRA. They all appear to maximize the number of districts in which 35% to 49.5% of the Voting Age Population identifies as Black. Such outcome is accomplished, in large part, by breaking apart geographically compact Black majorities in the City of Detroit and dispersing them in less compact districts that radiate outward from the City of Detroit toward suburban parts of Macomb Co. and Oakland Co. As a result of this engineered partial dilution of the concentrated Black vote, the maps feature zero Black-majority districts (down from over a dozen in previous maps). An argument in support of this approach to comply with the VRA is an estimate that a bit less than 40% of Black Voting Age Population suffices for a district to be a "district of opportunity" for Black voters, so that a candidate preferred by this Black minority would prevail in the primary and in the general election. Yet this estimate is based on incomplete data, especially for primaries. If 35% suffices, the strength of the Black vote is elevated beyond proportionality to population and may separate non-Black suburban and rural populations from their representatives. If it turns out too low, the Black vote, stripped of its majorities in geographically compact areas in the City of Detroit, may not be able to elect its preferred candidates in many of the districts. Black leaders in Detroit have expressed concern about this scenario.[48] We recommend that the MICRC reevaluate its approach toward compliance with the VRA in light of these questions. Since primary data is largely unavailable, they need to assess whether their districts are likely to enable preferred candidates to win racially-polarized primary elections. If the MICRC decides that its approach toward compliance with the VRA is indeed optimal, we suggest that it accompany its maps with a justification of how the plans comply with the Voting Rights Act and with the related Equal Protection clause in the U.S. Constitution.

4. With regard to Communities of Interest, it is not clear whether the MICRC has followed a systematic way to choose among COIs, nor how the Draft Proposed plans reflect them. Some districts others appear to break apart communities.[49] In attempting to incorporate publicly submitted COIs, the Commission sometimes goes beyond its criteria to assess whether local residents like the people and places included in their districts. We

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[48] https://www.freep.com/story/news/local/michigan/2021/10/12/detroit-officials-activists-decry-redistricting-maps/6056535001/

[49] For instance, the congressional Plan Apple splits the suburbs of Greater Grand Rapids, to form instead a narrow district connecting the urban core of Grand Rapids with Kalamazoo. Similar examples arise in Senate and House maps. Public complaints that districts split apart communities are discussed here: https://www.freep.com/story/news/local/michigan/detroit/2021/10/14/local-leaders-redistricting-commission-keep-communities-intact/6050257001/

recommend that the Commission focus on identifiable COIs within districts, not general comments about what areas should go with others. They can accompany any Proposed Map with an explanation of how the map reflects specific COIs, and how any splits were necessary. Reflecting communities of interest does not require creating fully homogenous districts. The congressional maps appear to lean in this direction, creating few competitive seats.

5. With regard to Partisan Fairness, we recommend that the Commission embrace a broader set of measures and take into account court rulings on partisan gerrymandering.[50] These determined that redistricting maps should be such that the partisan outcomes should not deviate greatly from the outcomes that we would expect under maps that did not take into account partisan considerations. Under this standard, a map may not always be better the closer to zero it brings symmetry measures such as the Efficiency Gap or the Lopsided Margin. Rather, a map is appropriate if its outcomes look normal, relative to what would happen under most maps drawn to satisfy other criteria. In this light, the maps proposed by the Commission perform well: they are not outliers, but within the normal range we would expect. From a symmetry standard, most maps tilt Republican; from a neutrality standard, most maps tilt Democratic. That means they go in the direction of symmetry from a neutral baseline (compared to maps that do not incorporate partisanship) and in the direction of neutrality from a symmetry baseline (compared to maps that were constructed to be exactly even in partisan outcomes).

6. In considering public comments, the Commission should keep its focus on their mapping criteria. General public comments about how well a citizen likes a district's shape or requests to maintain a district that excludes certain areas or types of people will be less helpful than those that point out how the Commission can meet its criteria. Where Communities of Interest can be identified, the public should point those out and should certainly expect the Commission to be responsive. But the Commission does not need to select maps that have the most positive overall public feedback if other maps would best meet its criteria. We remain ready and able to assist the Commission in evaluating their maps on their own interpretations of the criteria or those offered by the public.

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[50] League of Women Voters v. Commonwealth, 178 A.3d 737 (Pa. 2018) in Pennsylvania and Common Cause v. Lewis, 358 F. Supp. 3d 505 (D.N.C. 2019) in North Carolina

PART VIII. MICHIGAN'S REDISTRICTING HISTORY

In Article 1, Section 2 of the United States Constitution, it is specified that every decade an enumeration, or census, of every free person in a state must be utilized to apportion members of congress into districts of at most thirty thousand people. The same magnitude of people within] a district was later implemented in 1964 in the Supreme Court Case *Reynolds v. Sims,* 377 U.S. 533 (1964) in the adoption of the 'One-Person, One-Vote Rule. This rule specified that states had to apportion their populations equally among their state senate districts.[51]

The first U.S. census was initiated in 1790.[52] The census was a way to permit the framers of the Constitution to prioritize the population, rather than monetary status or land ownership, within the context of political power distribution.[53] Their goals were to ensure the government could determine the population outlook to better strategize and govern in reflection of the people. The data collected from the census would then lead to a redistricting effort that would result in allocation of resources, benefits, and population knowledge.[54] The manner and execution of how this is conducted and how districts are to be apportioned are left to the states to decide.

The original Michigan Constitution of 1835 set forth its parameters on how to apportion districts for members of its state legislature, stipulating that the quantity of state Senate seats must equate to one third of the state House seats, and the State House should not exceed 100 seats and have a minimum of 48 seats. Then in the Michigan Constitution of 1850, 32 State Senate districts were set which are "representative of the population" and do not split the boundaries of any county. In the ratification of the 1908 Michigan Constitution the number of apportioned State House districts was set to 110 under the similar conditions to the State Senate except that their districts cannot split the boundaries of cities or townships. Only slight provisions were made in the most recently ratified Michigan Constitution of 1963, changing the amount of apportioned state Senate districts to 38 and adding the constraint that state House districts must be contiguous, or that all parts of the district must be adjacent to one another.[55]

In 2018, Michiganders took the drastic initiative to take power over the redistricting process and join only seven other states that utilize an independent commission to redistrict their congressional, state Senate, and state House districts for every census. It was an effort to redraw districts in the best interests of the people and not politicians or more specifically, a particular party. The initiative won 61% of the population's approval, achieving majorities within both Democratic and Republican counties.[56]

The next step is to achieve that shared vision for an improved redistricting process. The Commission has the power to improve its maps, following the criteria outlined in the Constitution. We are pleased to continue assisting in that effort to improve democracy.

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[51] https://supreme.justia.com/cases/federal/us/377/533/
[52] https://www.census.gov/history/www/faqs/demographic_faqs/when_was_the_first_census_in_the_united_states.html
[53] https://www.census.gov/programs-surveys/decennial-census/about/why.html
[54] https://www.census.gov/programs-surveys/decennial-census/about/why.html
[55] http://www.legislature.mi.gov/(S(3as5j3btq3hebs3e5vyet0xc))/mileg.aspx?page=getObject&objectName=mcl-Constitution
[56] https://www.brennancenter.org/our-work/analysis-opinion/attack-michigans-independent-redistricting-commission