MICHIGAN REDISTRICTING 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 maps and of the Proposed maps. The collaborative Draft maps were, as their name indicates, collaboratively drawn by the MICRC and released on Oct. 11, 2021. The Commission voted to release four congressional maps, three Michigan Senate maps, and three Michigan House maps. These Draft maps were subject to a round of public hearings to conducted around the state from Wednesday, Oct. 20 to Tuesday, Oct. 26. Following these public hearings, the MICRC released the Proposed maps during the week from Nov. 1-5, 2021, which are the maps that advance to the final 45-day period of public hearings to stretch from Nov. 15, 2021 to Dec. 29, 2021.

In this report, the Institute for Public Policy and Social Research at Michigan State University analyzes 10 collaborative Draft maps and nine 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 maps and the 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 Draft map and each Proposed map performs on each of the seven criteria specified in a modification of the Michigan Constitution in 2018.

This updated report on Proposed maps, first released on Nov. 15, 2021, and based on analysis to that date, makes a set of observations:

- Plan Chestnut scores well on our measures of meeting the criteria, with notable advantages on some metrics among the three congressional redistricting plans.
- Any deviations from perfect Population Equality in congressional plans need justification.
- All collaborative Michigan Senate plans pursue a controversial path to comply with the Voting Rights Act. They all split the City of Detroit in such a way that every district has less than 45 percent African-American population. Individual Plan SD Kellom (named for Democratic commissioner Brittni Kellom of Detroit) offers an alternative approach in drafting three such districts.

- House plans Pine V5 and Hickory, and to a lesser extent Magnolia, lead to more Democratic seats than almost any computer-generated map. In an attempt to reduce Republican geographic advantages, these plans became outliers not expected by chance.
- It remains unclear how the Commission prioritized or selected among Communities of Interest submitted by the Michigan public for protection.
- The Commission would give itself more options and reduce legal risk by taking the time to make insubstantial edits to improve Population Equality in its congressional plans and by elevating Plan SD Kellom to an official Proposed collective state Senate map.

The first report on the Draft maps, released on Oct. 18, 2021, and based on analysis to that date, made a set of observations due immediate consideration:

- Some maps appear to be incomplete, with a number of 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 that are below majority.
- It isn't yet clear whether the MICRC has followed a systematic way to choose among which Communities of Interest to honor.
- Most Commission maps help Democrats to partially --- but not fully --- compensate for the unfavorable geographic concentration of Democratic voters. All maps favor Democrats according to some measures and favor Republicans according to other measures. Taking both views into account, we argue such maps generally follow Criterion F.

Since our first report, the Commission has repaired incomplete and non-contiguous maps. They also modified their Voting Rights Act compliance strategy for state House districts. Population equality, Voting Rights Act compliance, Communities of Interest prioritization, and partisan fairness measures all still deserve further consideration. But we are confident that the maps produced by the Commission will better meet the criteria outlined in the Constitution than the prior maps. Despite some complaints, the Michigan public and policymaking community share our confidence. This report is designed to help the Commission best achieve its objectives and help the public hold the Commission accountable.

Some maps await analysis and some measures are not yet available. Please see https://ippsr.msu.edu/redistricting as analysis continues to be updated. Under MICRC's published schedule, a final vote on all approved maps 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 X. Eguia, professor of economics, at 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 Dr. 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, and Dr. Jon X. 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.

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.

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 represents the interim 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 coordinate the analysis and reporting on the maps. This analysis brings together results from independent research teams at Tufts University, Yale University, Princeton University, University of Michigan, Duke University, and Michigan State University, all of them contributing their work to provide a better understanding of these maps and their consequences for the citizens of Michigan.

We rely primarily on materials made public by Prof. Moon 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. On partisan fairness, we use five independent sources of results: first, the results provided by the MGGG Redistricting Lab; second, results obtained by Dr. Christian Cox from Yale University; third, results from computational ensembles generated by the Princeton Gerrymandering Project (directed by Professor Samuel Wang) and released to the public through the project's Redistricting Report Cards; fourth, results from computational ensembles generated by the University of Michigan Redistricting Team (directed by Professor Timothy Ryan) in collaboration with the Duke Redistricting Group led by Professor Jonathan Mattingly and Professor Joseph Herschlag at Duke University; and fifth, results made freely available to the public by the redistricting application DRA 2020, available due to the work of a team of volunteers and housed online at davesredistricting.org

We are grateful that this entire network of researchers has generously contributed their expertise to this report.

Under the U.S. Constitution, congressional and legislative districts must be redrawn every 10 years upon completion of a new U.S. Census. A state constitutional amendment, forwarded by the grassroots organization Voters Not Politicians and 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 state 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 13-member 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 and we are excited to be a part of such a comprehensive effort.

LEAD AUTHOR

Jon X. Eguia, Ph.D., is a Professor of Economics and (by courtesy) of Political Science at Michigan State University. He joined Michigan State in 2014. He has also worked at New York University, the University of Bristol and at Harvard University. He serves as an Associate Editor for the *Journal of the European Economic Association*. His expertise is in Collective Choice, Institutional Design and Political Economy. His work on partisan fairness in redistricting is forthcoming in the *Election Law Journal*. He earned his doctorate in Social Sciences at Caltech in 2007.

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PART I. ABOUT THIS REPORT

This report provides a quantitative analysis of the collaborative Draft maps and the Proposed maps for Michigan Congressional Districts, for Michigan Senate districts, and for Michigan House of Representatives districts. The collaborative Draft maps were released to the public by the Michigan Independent Citizen Redistricting Commission (MICRC) to be considered during a second round of public hearings conducted from Oct. 20, 2021 to Oct. 26, 2021. The Proposed maps were released by the MICRC to be considered during a final round of public hearings scheduled from Nov. 15, 2021 to Dec. 29, 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 Draft maps. The Commission assigned each plan a name, and a codename based on a tree native to Michigan. We refer to the Draft maps by these codenames. Here is a table with the Draft maps and their names, obtained from the Commission's website at https://www.michigan.gov/micrc/.

TABLE 1. List of Collaborative Draft 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, which are not detailed in this report. Analyses are available here.

From Nov. 1, 2021 to Nov. 5, 2021, the Commission voted to release three collaborative congressional maps, three collaborative Michigan Senate maps, and three collaborative Michigan House maps. We analyze these nine collaborative maps, advanced to a 45-day public comment period, and to differentiate them from earlier maps, deemed Proposed maps. The Commission assigned each map a name based on a tree native to Michigan. Here is a table with the Proposed maps and their names. The information was obtained from the Commission's website.

TABLE 2. List of Collaborative Proposed Maps		
Type of District	**Codename**	**Plan Number**
State Senate	Cherry V2	251
State Senate	Linden	260
State Senate	Palm	261
State House	Pine V5	259
State House	Hickory	262
State House	Magnolia	263
Congressional	Apple V2	252
Congressional	Birch V2	253
Congressional	Chestnut	254

To inform the public in a timely manner, the first report on the Draft maps yielded analysis available in time for the first of the second round of public hearings. We subsequently complemented this initial report with additional analyses. The report is thus intended as a "living document," updated as more content becomes available. This document is version 2.1. of the report. The history of versions is as follows:

-Initial release on Oct. 18, 2021.

-Version 1.1: Includes a check of Contiguity in House maps, and a new recommendation to remedy House maps to address this criterion.

-Version 2.0: Introduces an analysis of Proposed maps.

-Version 2.1: Adds an abridged analysis of congressional plans CD Lange and CD Szetela, and expands on the analysis of Criterion E (fairness to candidates).

The latest version of this report is available at: ippsr.msu.edu/redistricting

Our report evaluates whether each map is complete and how well it meets the Commission's criteria. 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 map is a complete redistricting map that assigns each place of residency to exactly one district. We then assess each map on the basis of these seven criteria. We assess the congressional district maps in Part III (Draft maps) and in Part IV (Proposed maps); the Senate district maps in Part V (Draft maps) and Part VI (Proposed maps); and the House district maps in Part VII (Draft maps) and Part VIII (Proposed maps). 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 to produce the maps than to make them publicly available, so some variations are possible.

For comparison, we report the distribution of scores across all maps in what we term the "Public Ensemble," which are all the maps submitted by the public on the MICRC online portal, and what we term the "Computational Ensemble," which is 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 maps to both the Public Ensemble and the Computational Ensemble makes scores interpretable on a distribution of potential maps.

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 (in part because many maps were drawn before the new Census data was available).

For each of the three types of districts, the Computational Ensemble contains 100,000 maps 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 merges them, and then 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 members of the public can weigh the benefits of adhering closer to

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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.

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

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 whether each map sufficiently meets the criteria, and up to jurists and courts to determine if the maps meet legal tests.

What we offer is a battery of objective quantitative analyses reflecting how every collaboratively Draft map and every collaboratively Proposed map performs on each of the seven criteria specified in the Michigan Constitution, noting concerns for further consideration and issuing recommendations based on our quantitative analysis.

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 DRAFT MAPS FOR MICHIGAN'S CONGRESSIONAL DISTRICTS

III.1. THE DRAFT CONGRESSIONAL DISTRICT MAPS

On October 11, the MICRC approved the following collaborative 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.
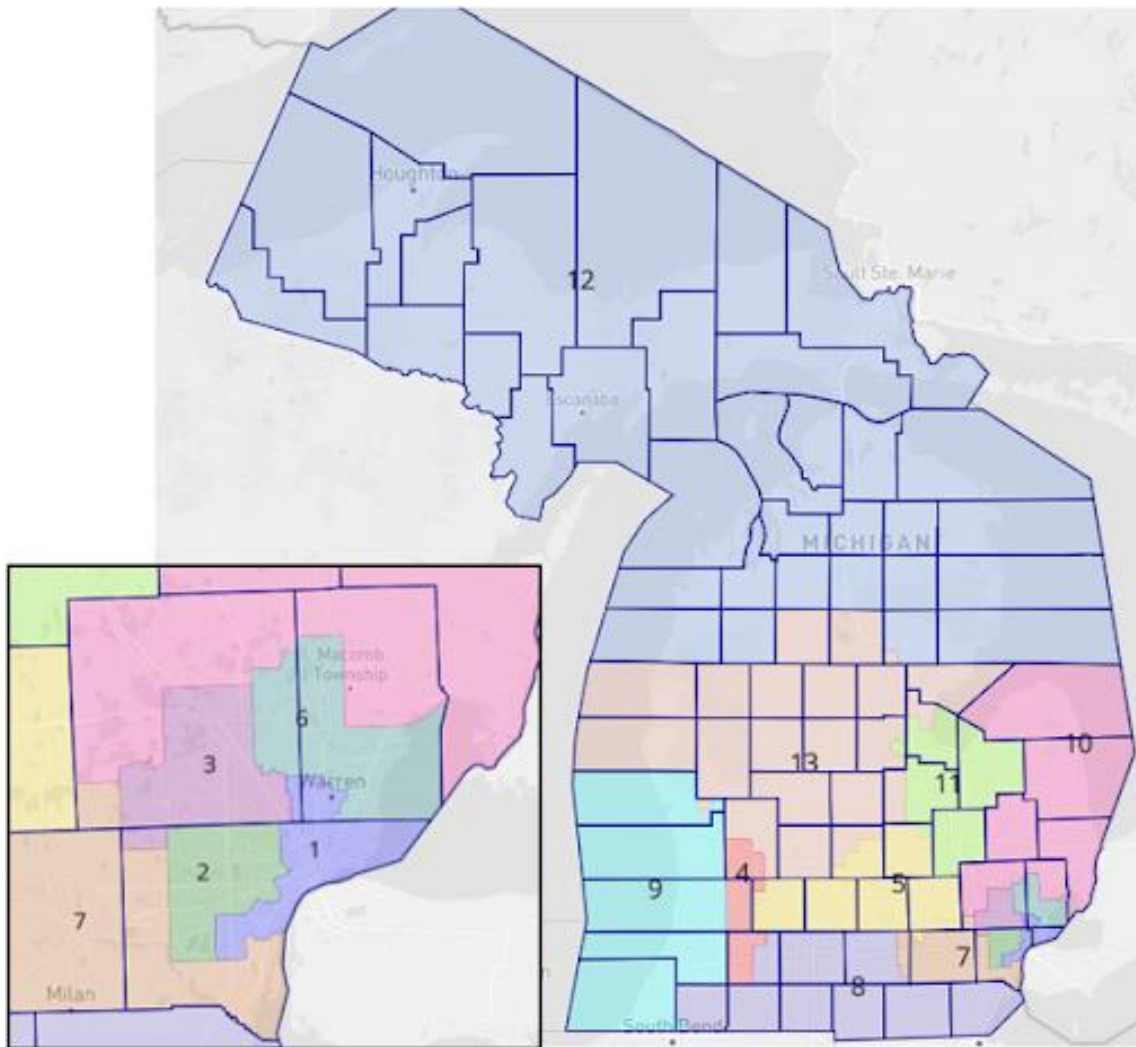
Plan Apple

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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 not be a valid redistricting plan, 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]
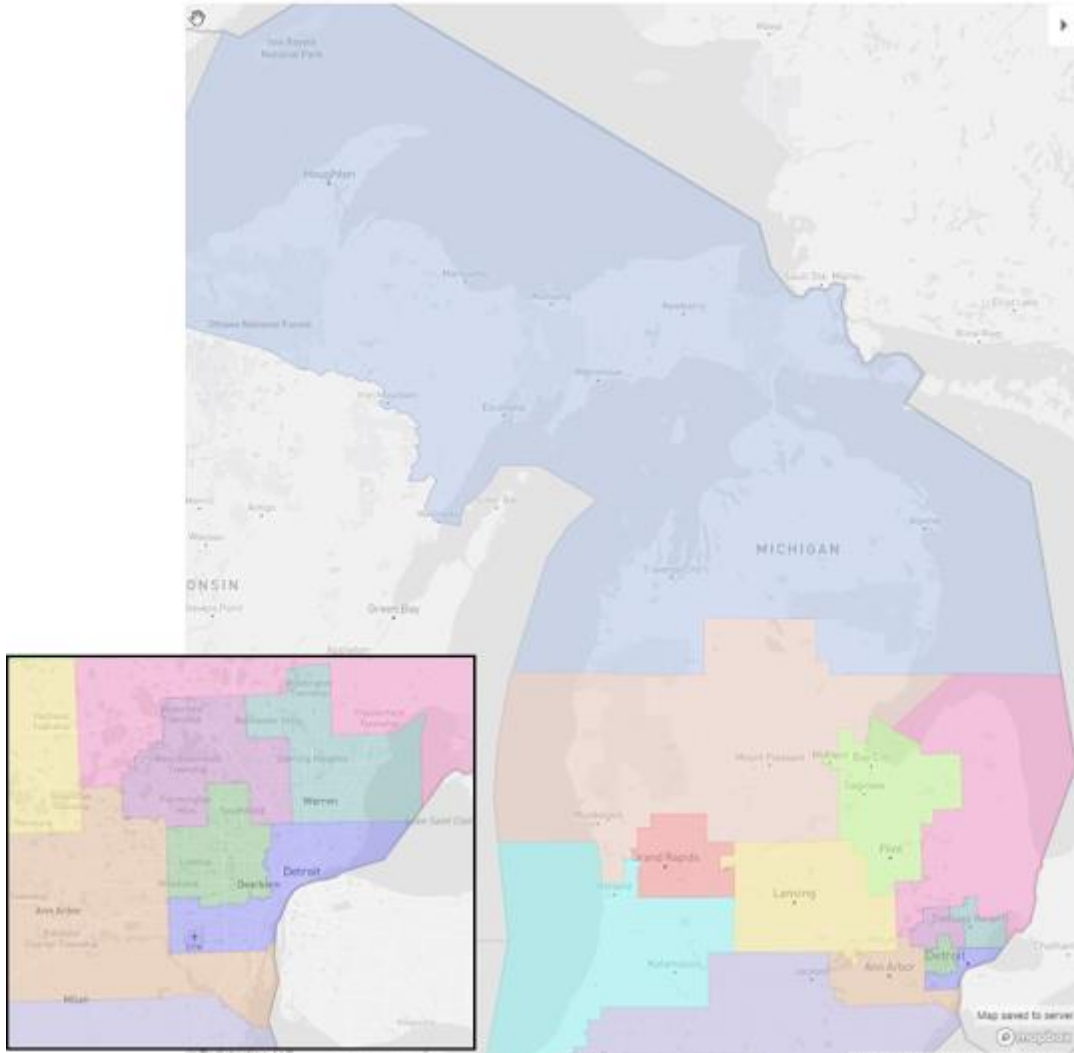
Plan Juniper

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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.
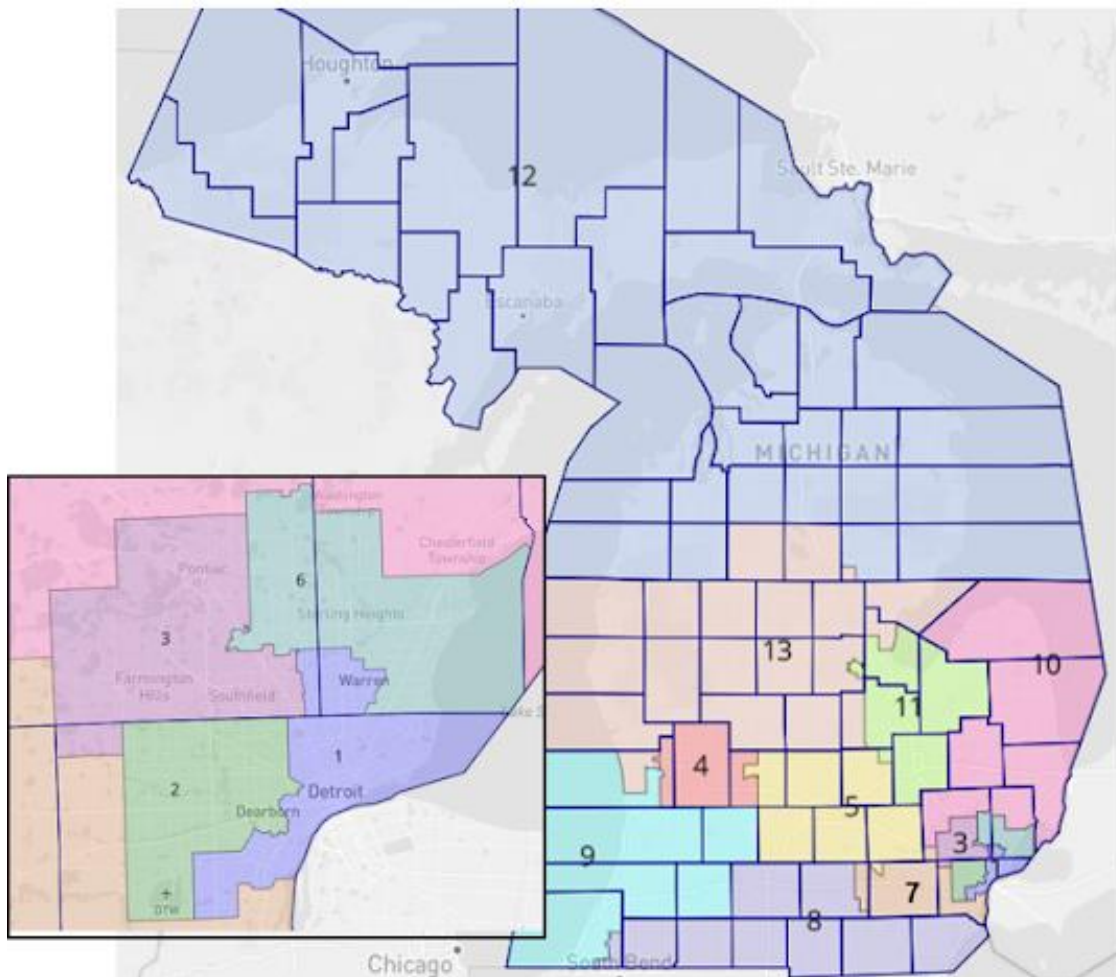
Plan Maple

-**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]
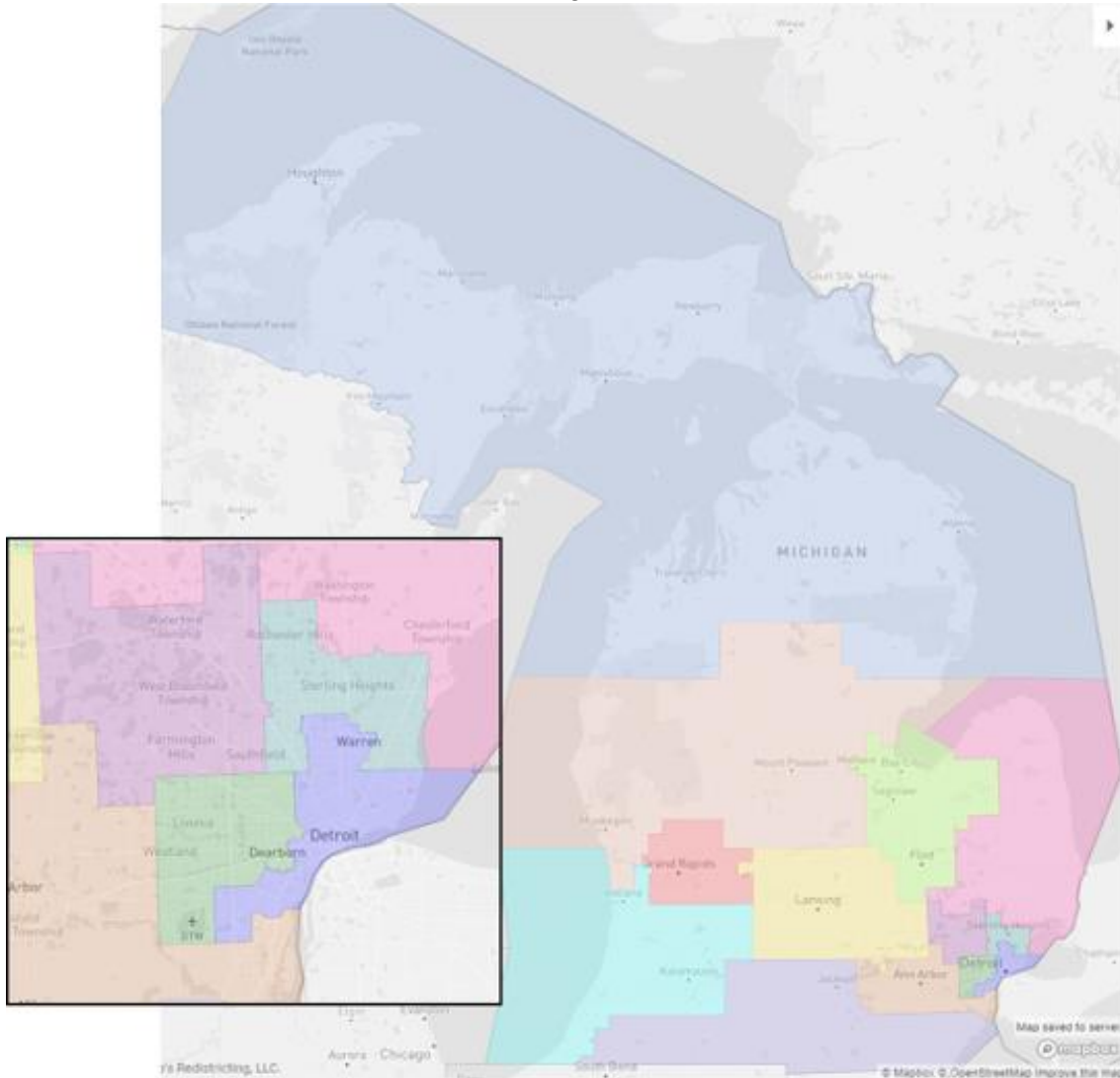
Plan Birch

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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 U.S. Census, in this case the 2020 U.S. Census. The Michigan population according to the 2020 U.S. 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).

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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

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,

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

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

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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.

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.

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 is 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 Congressional 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 3. *Population Equality in congressional maps.*		
	Population difference	**Maximum 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 4. *Black minority districts of opportunity in congressional Draft 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 Population		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 least common maps such that only 2.5% of maps have shares above or below the range covered by the arms.
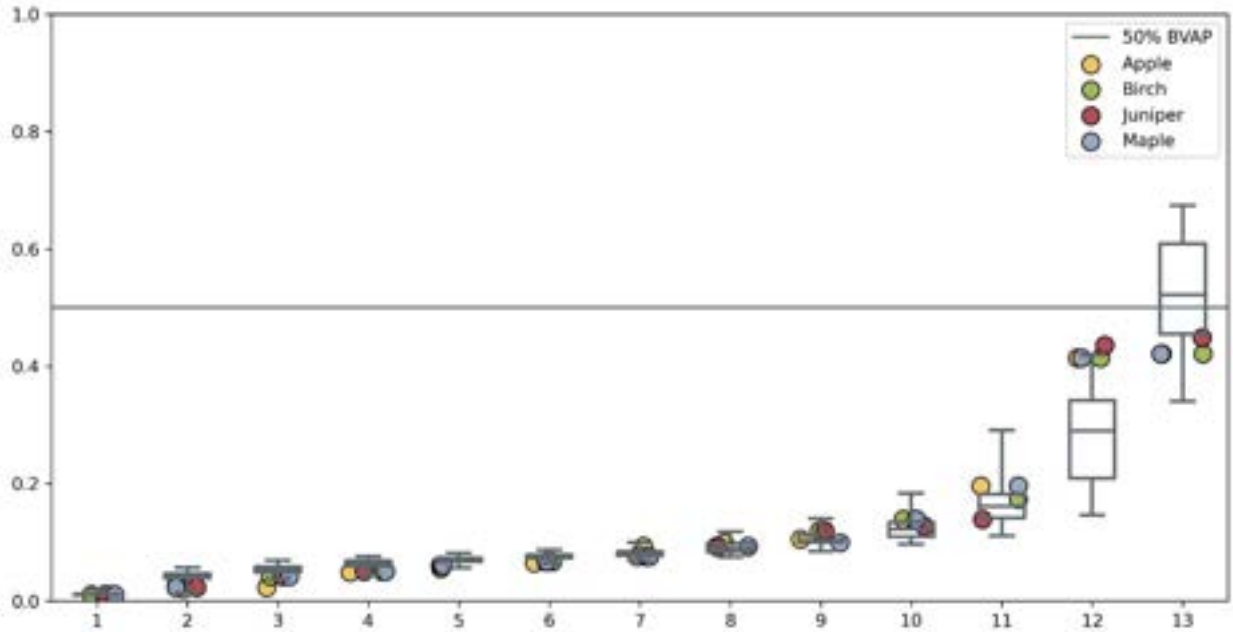
Figure 1. Distribution of Black VAP by Congressional District

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.

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 congressional maps satisfy contiguity.

TABLE 5. *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.

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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.

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 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 Oct. 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.

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 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 90 percent to establish whether a COI cluster either has 90 percent of its residents contained within a district or a district has 90 percent of its residents within a COI cluster. This accounts for COI clusters that are smaller and larger than the district size. It is easier to fit a COI cluster within a larger district and easier to fit a smaller district within a COI cluster.

IPPSR plans to release further analyses on individual COI simulations, if and when they become available. Districting plans could preserve individual COIs even if they do not preserve clusters.

Results.
As seen in the COI preservation in Michigan (Congress) histogram by the MGGG lab, the Tree maps do not stand out for their preservation of Community of Interest clusters, at least not as these clusters are computed by the MGGG Lab. Out of 34 submitted COIs, Apple preserves 11, Birch preserves 13, Maple preserves 12, and Juniper preserves 12. That means most COI clusters are not 90 percent contained within districts and most districts are not 90 percent contained within COI clusters, but that is also what would be expected of randomly-drawn maps.

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[15] We follow version 2.0 of this report, dated Sept. 13, 2021.
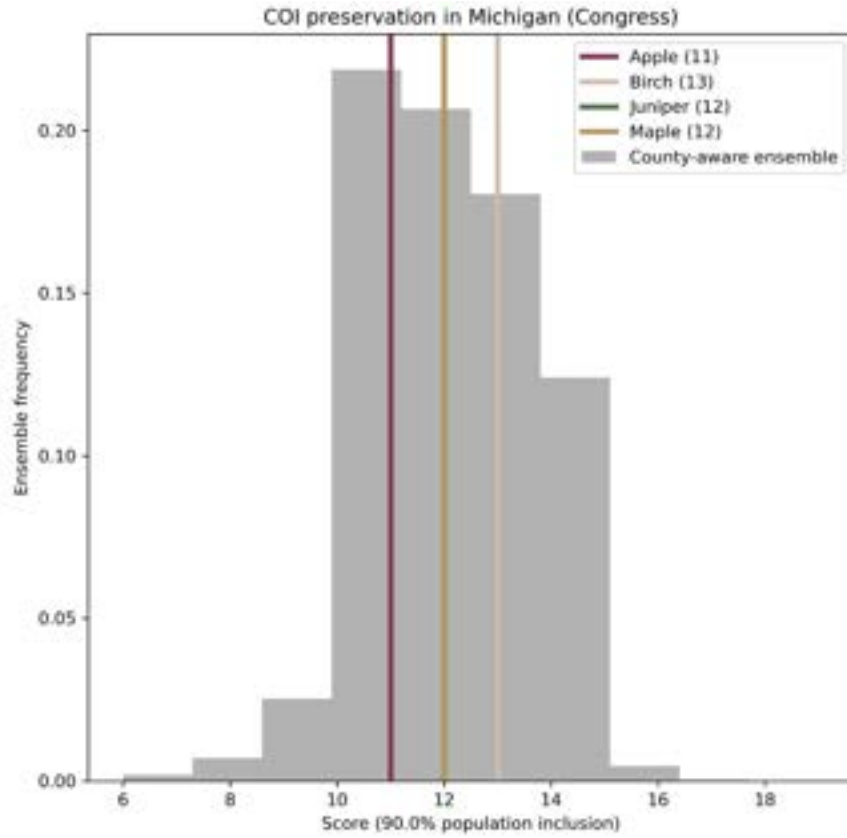
Figure 2. Community of Interest Preservation in Congressional Maps

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. It is most often computed for an equal vote share between the two largest parties. Following the MGGG Lab definition, we compute it for the pair of two largest parties (Republican and Democratic), and for an equal average district vote share between these two parties.[18]

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%.[19] 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[20] 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.

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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 average is the sum of vote shares in each district over the number of districts; if turnout varies across districts, then it does not coincide with the statewide vote share.

[19] 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%.

[20] Stephanopoulos, Nicholas O., and Eric M. McGhee. "Partisan gerrymandering and the efficiency gap." U. Chi. L. Rev. 82 (2015): 831.

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.

This is one of four measures used by Dr. Handley in her memo on Partisan Fairness, presented to the MICRC on Oct. 1, 2021.[21]

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.[22] 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. [23]

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.[24] 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

[21] 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

[22] 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.

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

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

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.

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 compare the seat outcome under this map to the seat outcomes under the maps in a County-aware computational ensemble containing one million maps, generated by the Princeton Gerrymandering Project.

Their methodology is explained at https://gerrymander.princeton.edu/reforms/MI

We use their ensemble to answer the following question: how many of those maps would give more seats to the Democratic party than the map under consideration? How many of them would give more seats to the Republican party? If almost all maps would give more seats to, say, the Democrats, then the analyzed map is an outlier, and thus suspect.

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 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 U.S. 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). The 2014, 2016, 2018, and 2020 US 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). For all these measures, we compute results election by election, and then we average out. The Princeton Gerrymandering Project uses the 2018 MI Governor, 2020 US Senate and 2020 US Presidential election, first averaging them out to construct an electoral composite in each precinct, and then using this composite to compute the results reported under the Outlier Test (D7).

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 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 votes. The "Outlier" (D7) indicates a party ("D" for Democratic or "R" for Republican) and a range of percentages. The letter indicates the party that this map favors, relative to the one million other maps in the Princeton Gerrymandering Project ensemble. The first number is the share of maps in the ensemble that are less favorable to this party (in the sense that the party would obtain fewer seats), and the second is the share of maps that are even more favorable (in the sense that the party would obtain more seats).

TABLE 6. *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	D: 82% - 2%
Plan Juniper	+1.7 seats	+6.7%	+0.47 seats	+2.0%	+4.5%	+0.39 seats	D: 82% - 2%
Plan Maple	+1.7 seats	+6.7%	+0.47 seats	+2.1%	+4.5%	+0.73 seats	D: 82% - 2%
Plan Birch	+0.7 seats	+5.0%	+0.27 seats	+1.7%	+4.1%	+0.06 seats	D: 82% - 2%

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, U.S Senate, Governor, Secretary of State, and state Attorney General) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 7. *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 3 illustrates this regularity, using the election results from the 2018 Senatorial election.[25] 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%.

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[25] 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.
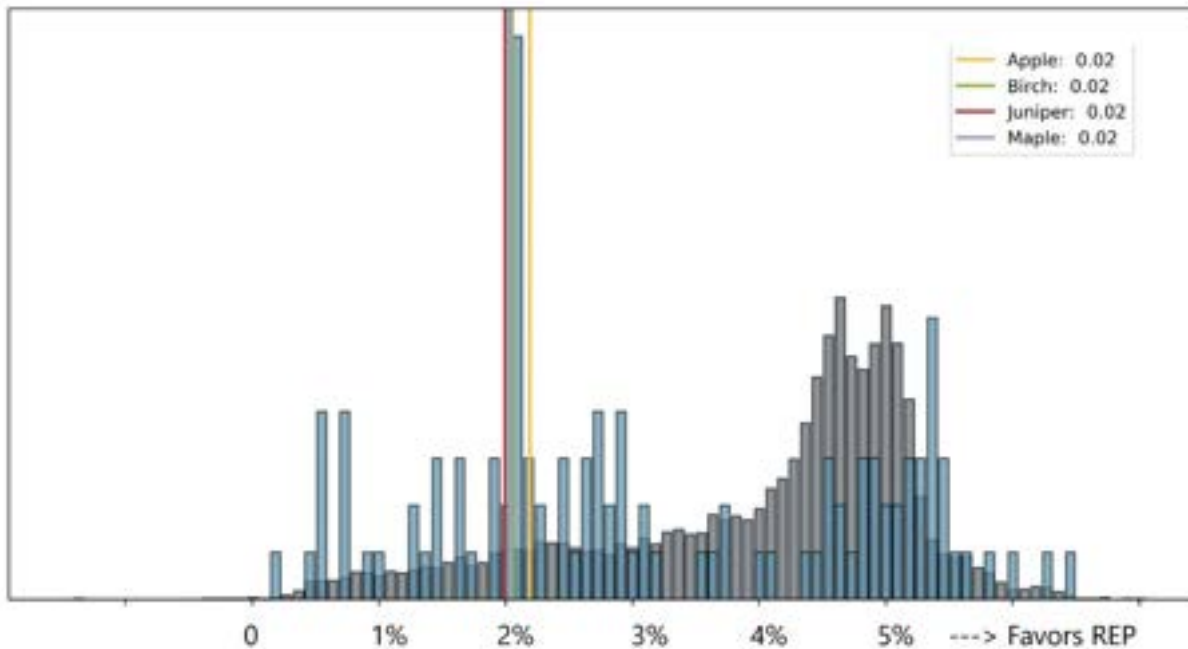
Figure 3. Median-Mean Difference, Congressional Maps, Senate 2018 Election

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 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 unusual, 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 4.
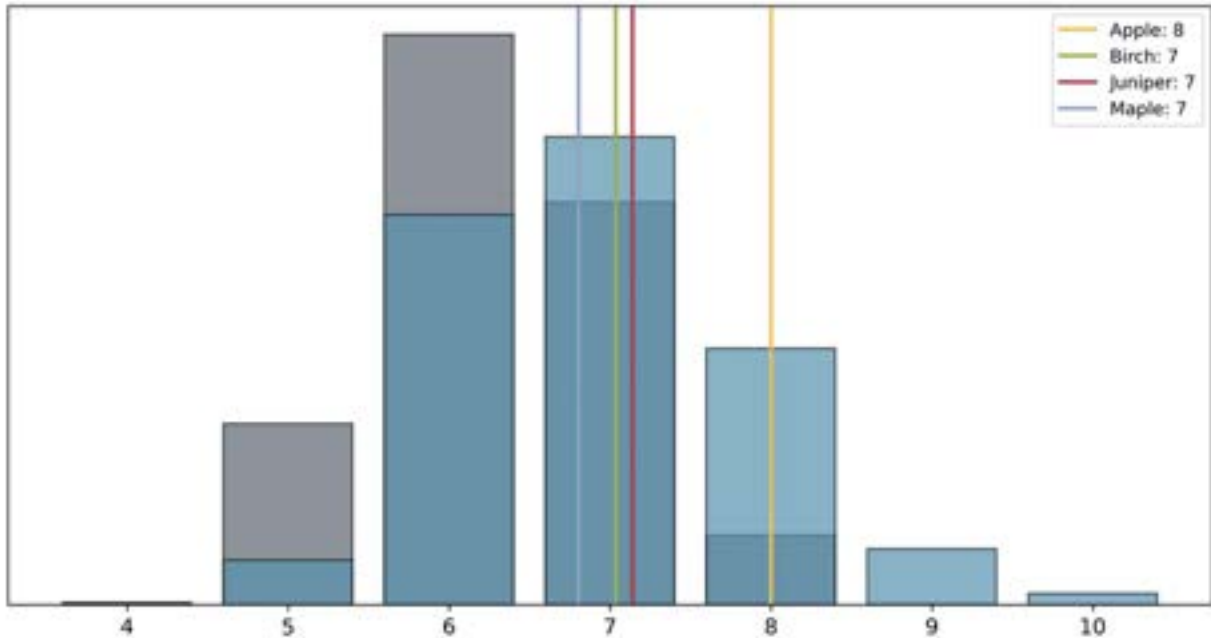
Figure 4. Number of Seats Democrats Would Win with Senate 2018 Results

The horizontal axis in Figure 4 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 would lead to such a number of Democrat 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 nine or even 10 seats are 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 do.

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 U.S. 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 compared 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,[26] 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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[26] 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 district) is seen in the histogram below. Compared to the computer-generated maps, the publicly drawn maps have a greater tendency to double-bunk incumbents. The Apple and Birch maps both feature three districts with two incumbents, while Maple and Juniper feature four.
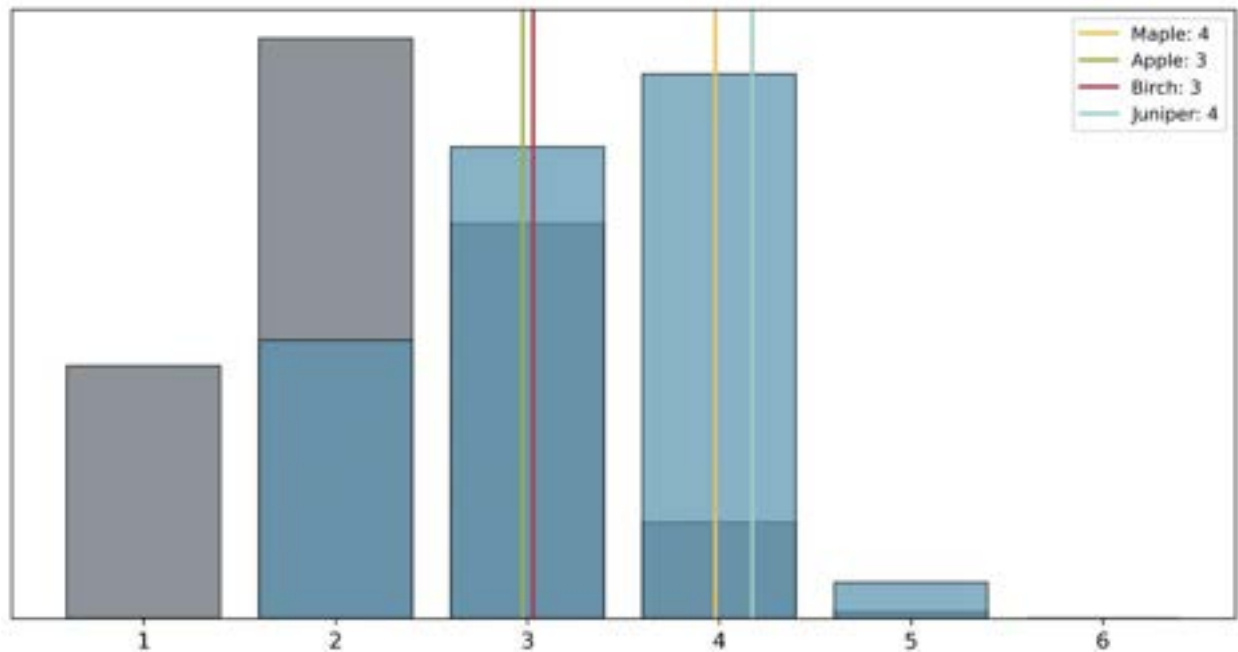

Figure 5. Districts with Multiple Incumbents in Congressional Maps

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 6 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 seemed 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.
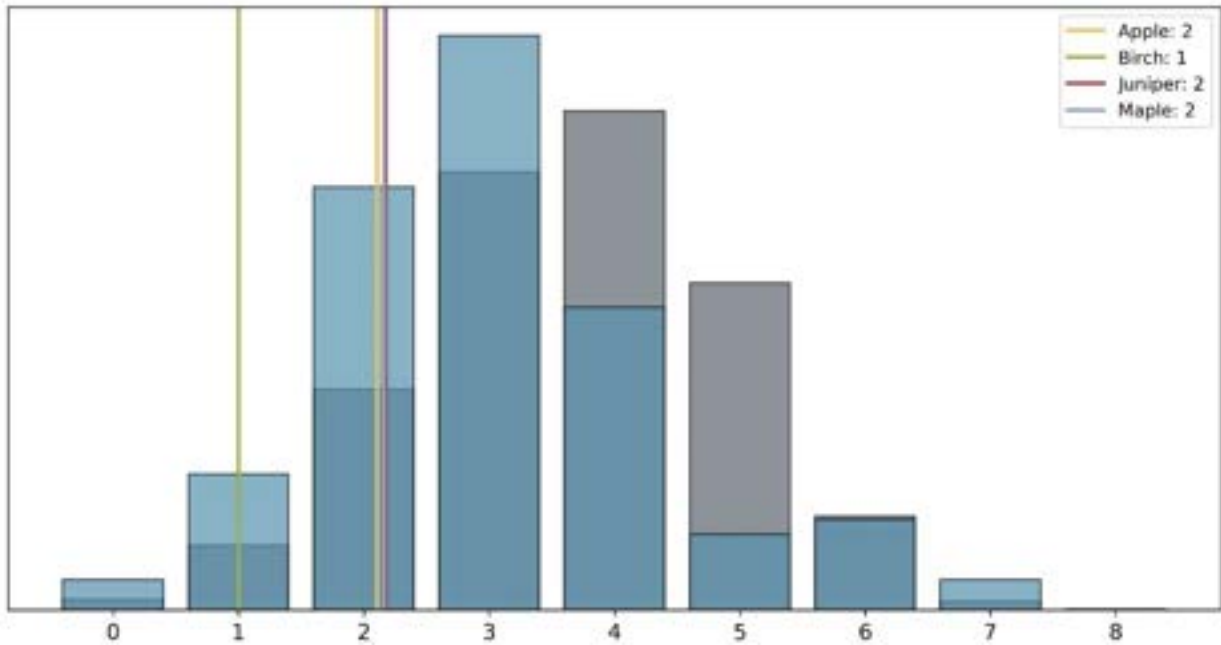
Figure 6. Number of Competitive Districts in Congressional Maps

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.[27]

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 splits.

TABLE 8. 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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[27] 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.
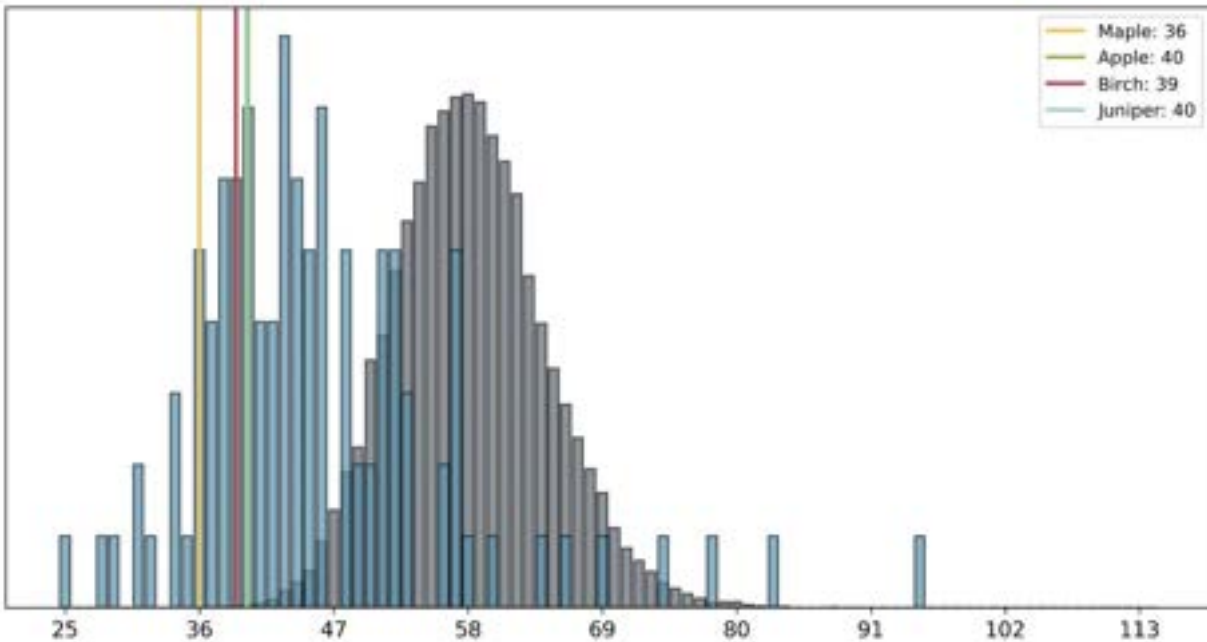
Figure 7. Split Municipalities in Congressional Maps

As seen in the Split Municipalities histogram, the Tree maps and publicly drawn maps split municipalities far less than computer generated maps do. Maple splits 36 municipalities, Birch splits 39, and Maple and Juniper both split 40. Most publicly drawn maps and nearly all computer-generated maps split more municipalities (including townships, cities, and villages).

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

As Figure 8 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.
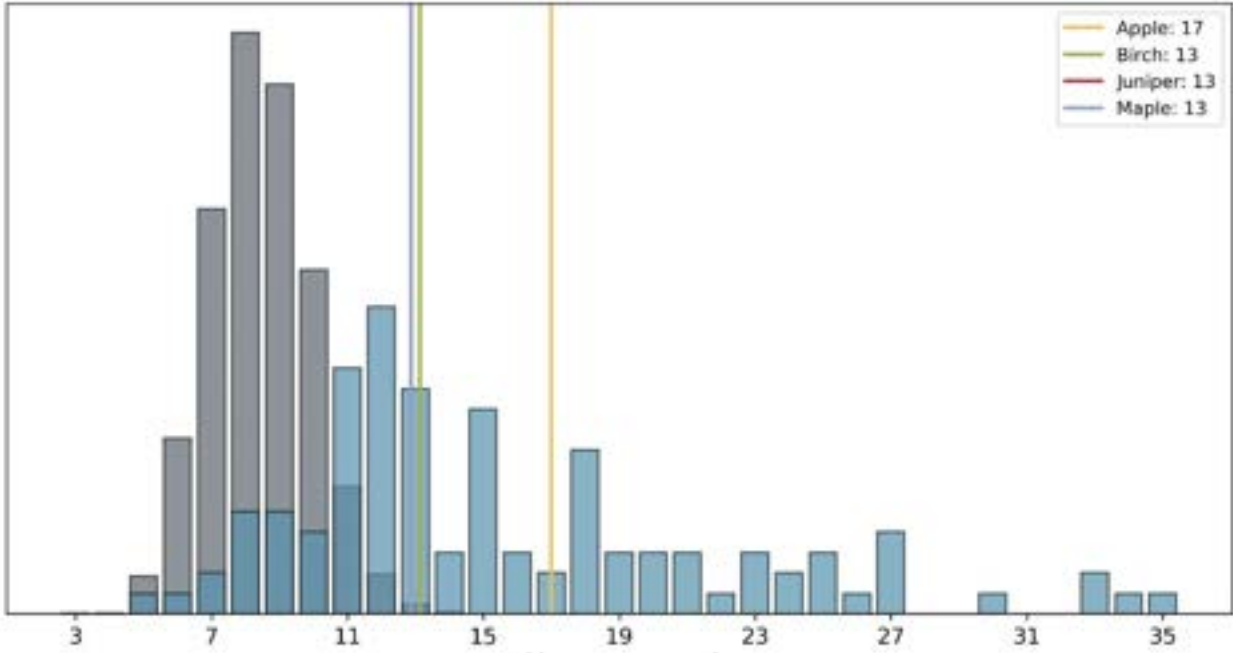
Figure 8. Number of Split Counties in Congressional Maps

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.[28]

TABLE 9. *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 9.
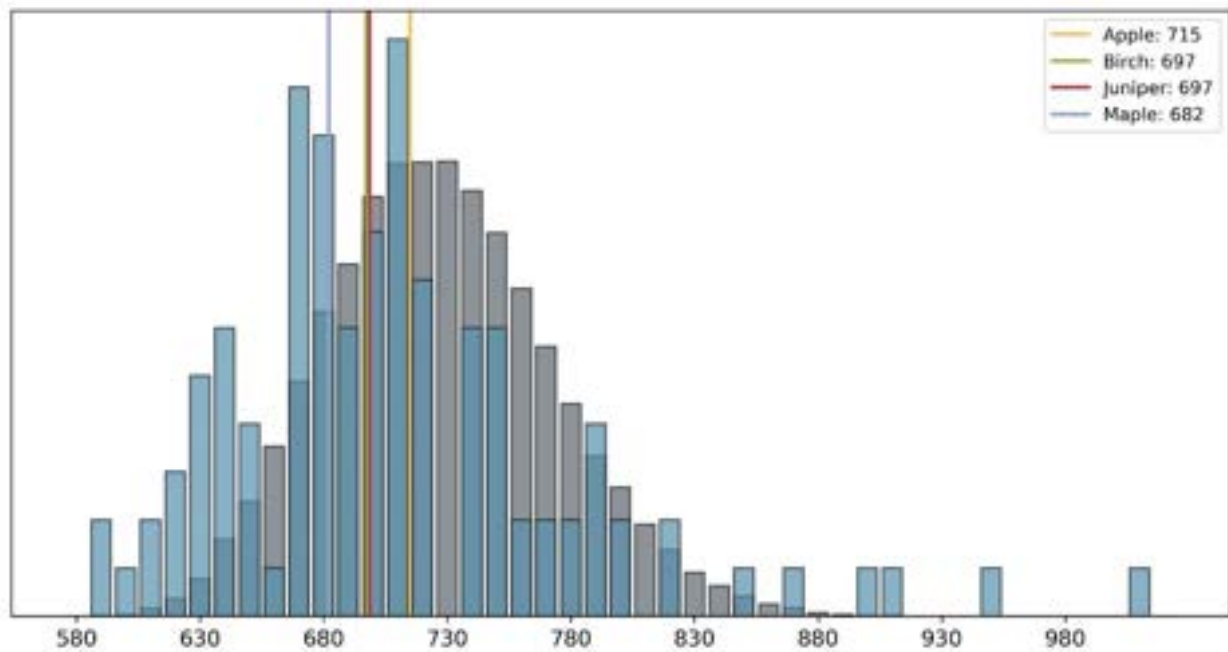

Figure 9. Number of Cut Edges (fewer is more compact)

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[28] The Reock and Polsby-Popper measure are as reported by DRA 2020. The Cut Edges measure 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, we cannot say that they fully reflect the collection of Communities of Interest submitted by citizens.

All four plans perform well overall according to a collection of accepted measures of partisan fairness.[29] 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 do not reflect consideration of county boundaries as much as the ensemble plans, but they are reasonably compact.

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[29] 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 MAPS FOR MICHIGAN'S CONGRESSIONAL DISTRICTS

III.1. THE PROPOSED CONGRESSIONAL DISTRICT MAPS

On Nov. 1, 2021, the MICRC approved the following Proposed maps for U.S. Congressional Districts, for consideration in what is expected to be the final round of public hearings (Nov. 15 – Dec. 29, 2021): [30]

-**Plan "Apple V2",** (map number #252), on a vote of 11-2 (Commissioners Clark (R) and Wagner (R) opposed; Curry (D) and Lange (R) not voting).
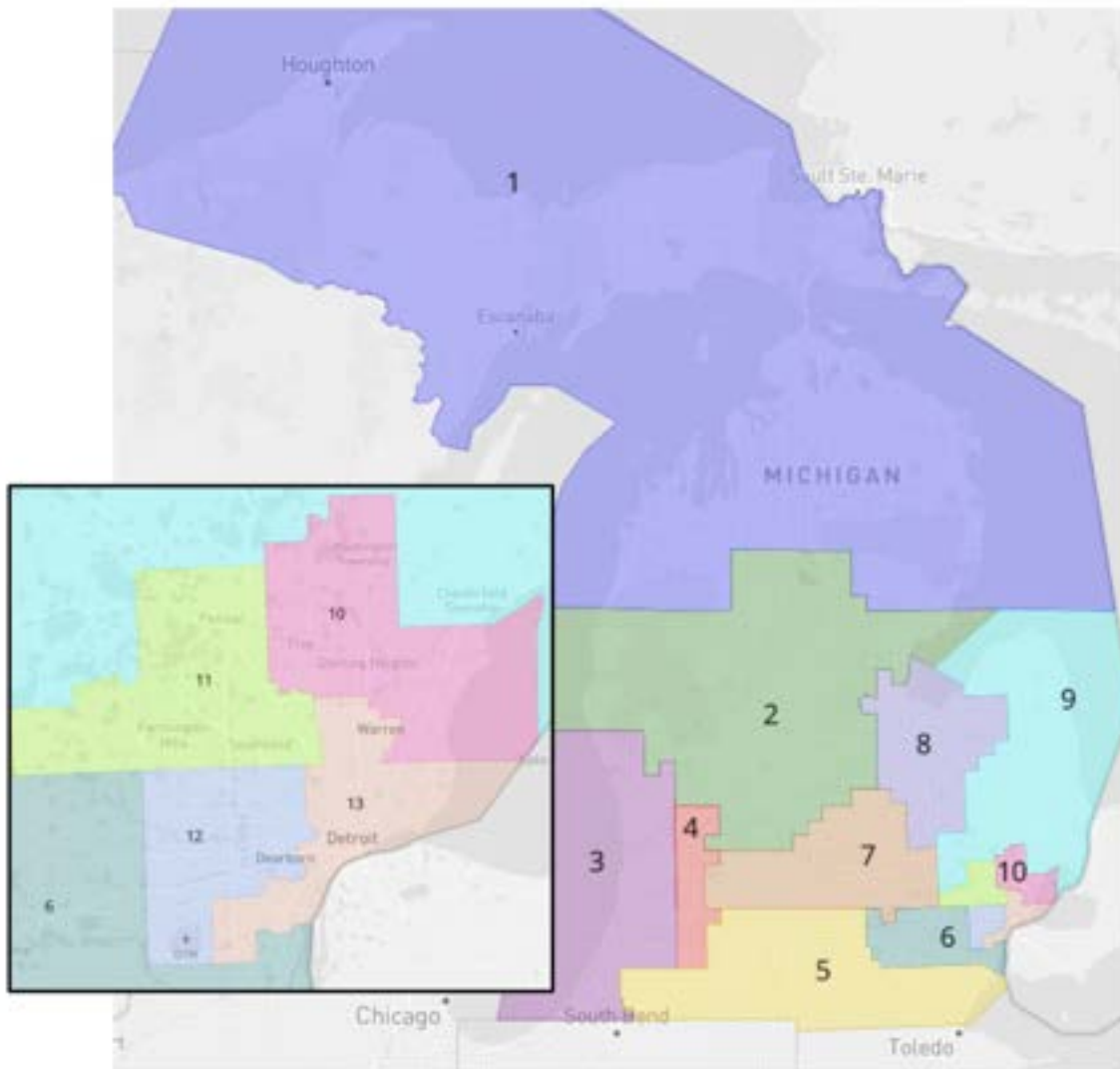
Plan Apple V2

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

-**Plan Birch V2** (map number #253), on a vote of 9-2 (Commissioners Wagner (R) and Kellom (D) opposed; Curry (D) and Lange (R) not voting).

Plan Birch V2

-**Plan Chestnut,** (map number #253), on a vote of 10-1 (Commissioner Wagner (R) opposed; Curry (D) and Lange (R) not voting).

Plan Chestnut

IV.2. MEASURING PERFORMANCE ON EACH CRITERIA

CRITERION A: POPULATION BALANCE AND VOTING RIGHTS ACT
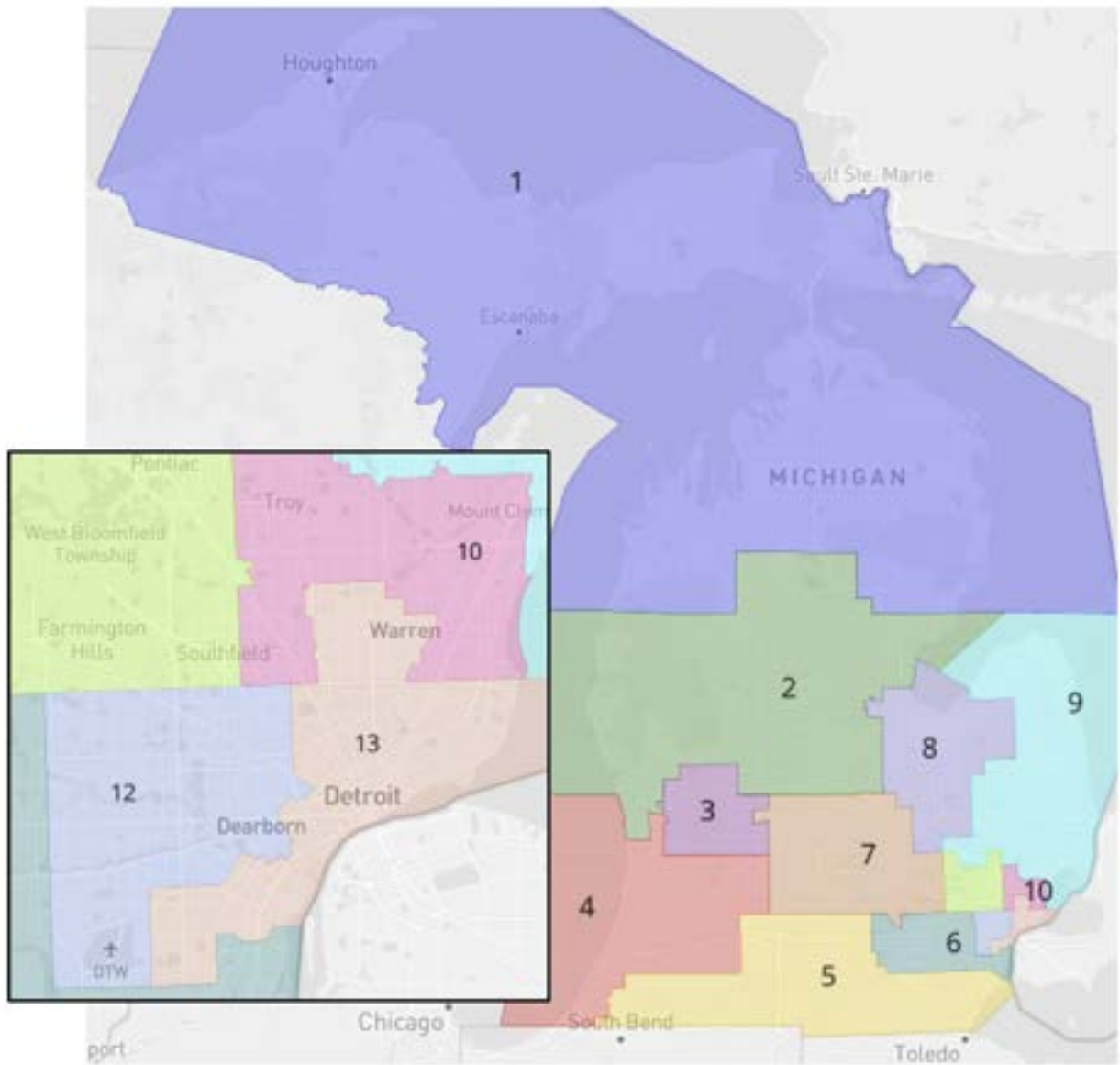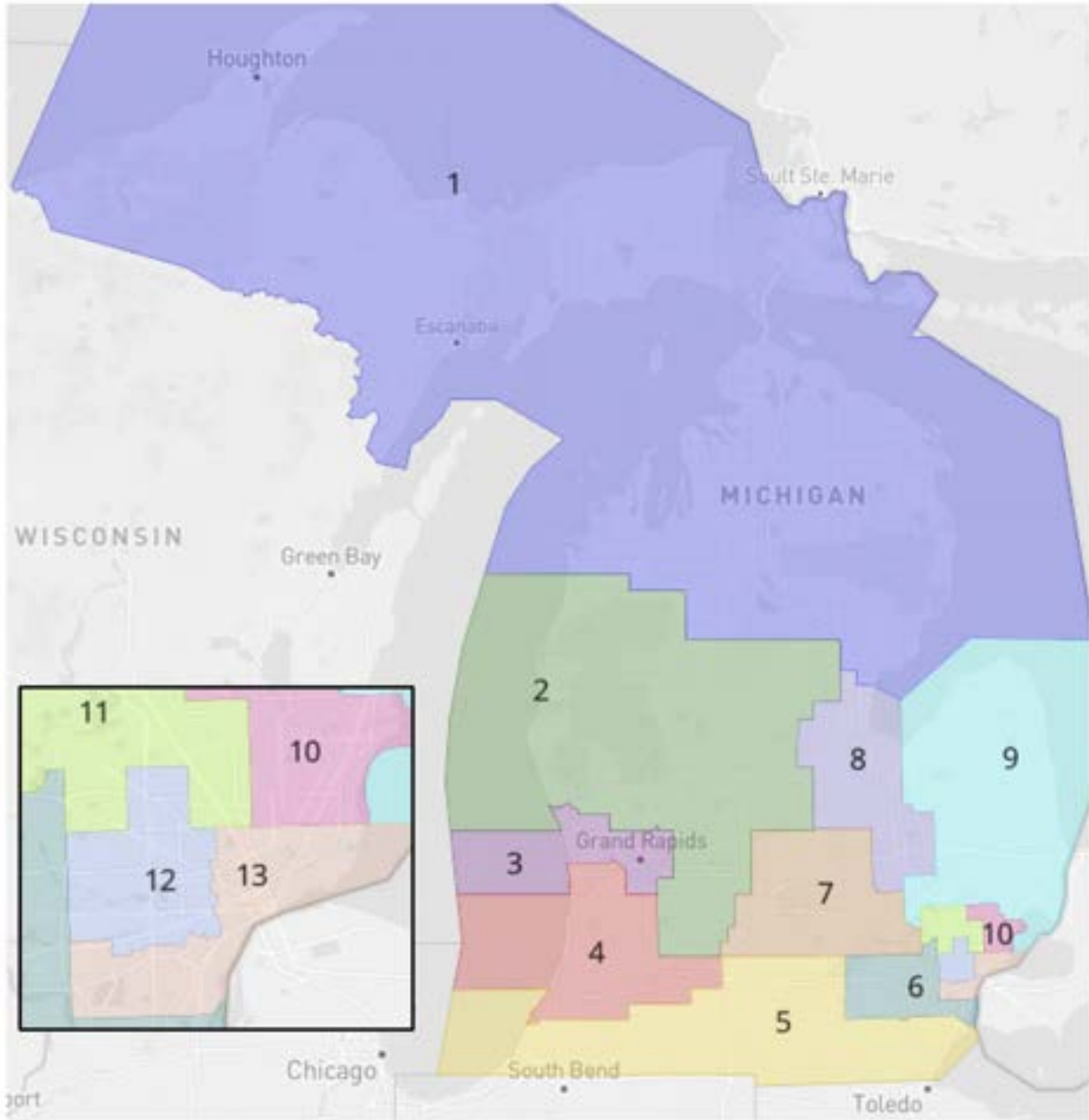
"Districts shall be of equal population as mandated by the United States constitution, and shall comply with the voting rights act and other federal laws."

Understanding the Criterion.
We refer to the discussion under Section III.2.A.

Measures of performance on Criterion A.
We refer to the discussion under Section III.2.A.

Results.
We present the results of Population Equality in the following table. Each row lists a redistricting plan for Michigan Congressional 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 10. *Population Equality in Congressional Maps.*		
	Population difference	**Maximum deviation**
	%	%
Plan Apple V2	0.48%	0.26%
Plan Birch V2	0.26%	0.15%
Plan Chestnut	0.14%	0.08%

Note that the population difference in Plan Apple V2 (0.48%) is close to a population difference that the Supreme Court, in at least one instance, has found unjustified (0.7%), rendering that plan unconstitutional.[31] Even the smaller deviations in Plan Birch V2 and Plan Chestnut 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).

Justifying the small deviation in Plan Chestnut (about 1,000 inhabitants; less than a typical precinct) would be easier than justifying the deviation in Plan Birch V2 (about 2,000 inhabitants, about as much as a typical precinct). Justifying the deviation in Plan Apple V2 (over to 3,700 inhabitants, much larger than a typical precinct) would be hardest of all three.

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[31] Karcher v. Daggett, 462 U.S. 725 (1983), ruling on the New Jersey 1981 congressional plan.

For the sake of comparison, across all 43 states that were apportioned as more than one congressional district by the 2010 U.S. Census, only one (West Virginia) adopted a plan with a population difference at least as large as that of any of the three Proposed plans, and that one plan was challenged in Court due to its deviation from population equality.[32] In other words, these population deviations are unusually large. [33] In particular, in terms of population deviation, Plan Apple V2 is closer to what has been ruled unconstitutional, than to any deviation level that was not challenged in Court in the latest redistricting cycle.

With regard to districts of opportunity, 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 11. *Black Minority Districts of opportunity in Congressional Proposed Maps.*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Apple V2	0	2	2
Plan Birch V2	0	2	2
Plan Chestnut	0	2	2
2012-2021 Official Plan	2	2	2
Proportional to Pop.	2		

The most notable result is that neither of the two majority-minority districts in the previous plans survives in any of the 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 (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 unusual maps such that only 2.5% of maps have shares above or below the range covered by the arms.

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[32] *Tennant v. Jefferson County Com'n*, 133 S. Ct. 3, 567 U.S., 183 L. Ed. 2d 660 (2012).
[33] 2010 Redistricting Deviation Table. National Conference of State Legislatures. Available at https://www.ncsl.org/research/redistricting/2010-ncsl-redistricting-deviation-table.aspx
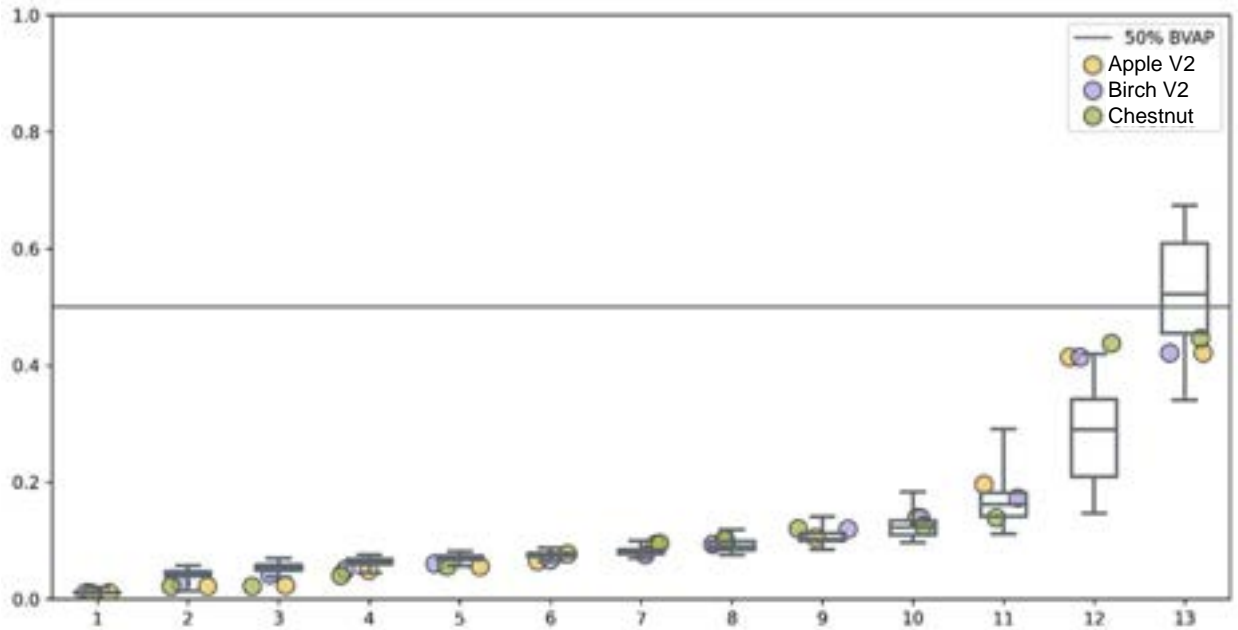
Figure 10. Distribution of Black VAP by Congressional District

As we can see in Figure 10, these three 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 approximately 42% of Black VAP in plans Apple V2 and Birch V2, and approximately 44% of Black VAP in Plan Chestnut.

While the difference between 42% and 44% VAP share may seem small, the consequences could be important. There is no exact threshold of Voting Age Population that turns a district into a district of opportunity, and we lack sufficient data on recent primaries to be confident about our predictions on racially polarized voting. Based on the estimates we have, a 42% share of VAP probably suffices for a minority to be able to elect its candidates of choice, but districts with a 44% share are safer, stronger districts of opportunity, in which the minority can most likely elect its preferred candidates if it votes cohesively.

Therefore, as with population equality, we find that Plan Chestnut may measure up better than plans Apple V2 or Birch V2 on any question about compliance with the VRA that a reasonable person might harbor.

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.
We refer to the discussion under Section III.2.B.

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 Proposed congressional maps satisfy contiguity.

TABLE 12. *Contiguity of Proposed Congressional Maps*	
	Are all districts contiguous?
Plan Apple V2	Yes
Plan Birch V2	Yes
Plan Chestnut	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.
We refer to the discussion under Section III.2.C.

Measure of Reflection of Communities of Interest.
The MGGG Redistricting Lab and Open-Maps Coalition have released a report on "Communities of Interest Clusters for Michigan."[34] This report identifies 34 communities of interest clusters that were identified through aggregation from all Community of Interests submissions by the public up to September 1, 2021. A "cluster" is a geographic area in which several individual submissions overlap. 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.

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.

For a quantitative measure that can aid —but not supplant— the holistic evaluation, we report the share of clusters that overlap with a district, in the sense that either at least 90% of the population of a district is inside the cluster, or at least 90% of the population in the cluster is inside a district, and we compare this share with the shares across all maps in the computational ensemble.

Results.
Of the 34 COI clusters, Apple V2 meets the criteria for 11, Birch V2 for 12, and Chestnut for 10. Most county-aware ensembles meet the criteria for at least 10 and up to 15. That means the plans do not show a lot of responsiveness to COI clusters compared to computer maps drawn without attention to COIs.

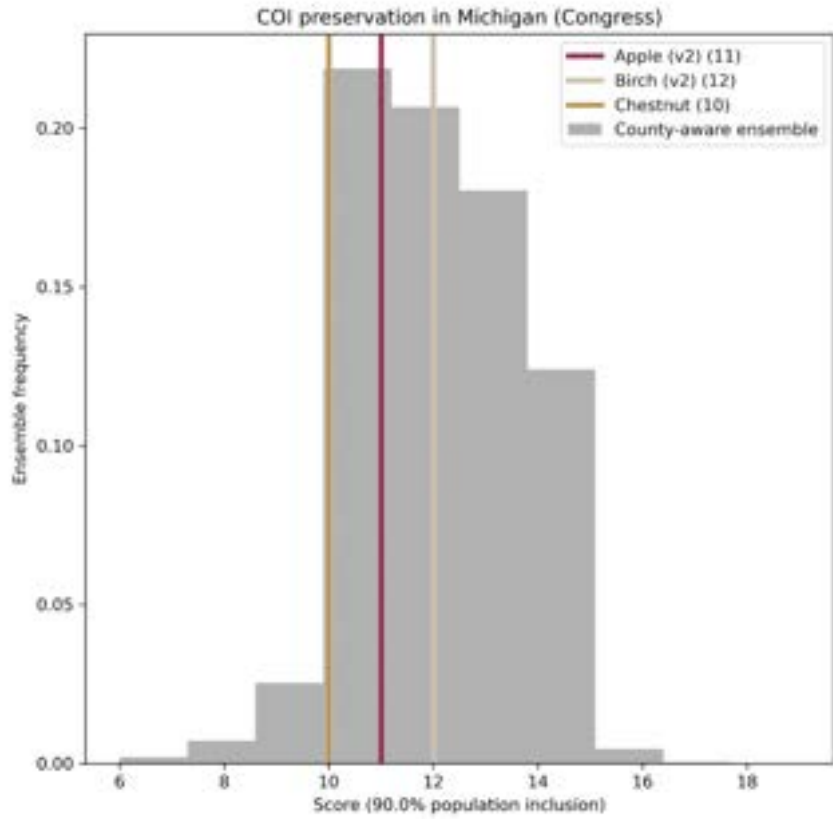[34] We follow version 2.0 of this report, dated September 13, 2021.

Figure 11. Communities of Interest Preservation in Congressional Maps

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.
We refer to the discussion under Section III.2.D.

Measures of partisan fairness.
We refer to the discussion under Section III.2.D.

For the measures described under D8, for readers' convenience, we published the three Proposed congressional maps in DRA 2020 under the names: "CD Apple V2", "CD Birch V2", and "CD Chestnut".

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

The 2018 gubernatorial, the 2018 Secretary of State; the 2018 Attorney General elections; the 2016 Presidential election; and the 2018 U.S. 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). The 2014, 2016, 2018, and 2020 U.S. 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). For all these measures, we compute results election by election, and then we average out. The Princeton Gerrymandering Project uses the 2018 Michigan Governor, 2020 U.S. Senate and 2020 U.S. Presidential election, first averaging them out to construct an electoral composite in each precinct, and then using this composite to compute the results reported under the Outlier Test (D7).

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 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 votes. The "Outlier" (D7) indicates a party ("D" for Democratic or "R" for Republican) and a range of percentages. The letter indicates the party that this map favors, relative to the million other maps in the Princeton Gerrymandering Project ensemble. The first number is the share of maps in the ensemble that are less favorable to this party (in the sense that the party would obtain fewer seats), and the second is the share of maps that are even more favorable (in the sense that the party would obtain more seats).

TABLE 13. *Measures of Partisan Fairness for Congressional District Proposed Plans.*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Apple V2	+0.7 seats	+0.6%	−0.33 seats	+1.8%	+3.4%	+0.06 seats	D: 82% - 2%
Plan Birch V2	+0.7 seats	+5.0%	+0.27 seats	+1.7%	+3.3%	+0.06 seats	D: 82% - 2%
Plan Chestnut	+1.3 seats	+0.4%	−0.33 seats	+1.7%	+1.9%	−0.28 seats	D: 82% - 2%

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, U.S. Senate, Governor, Secretary of State and State Attorney General) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 14. *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 V2	--	+1.2%	-1.5%	+2.4%	+4.0%	--	--
Plan Birch V2	--	+0.7%	-1.5%	+2.2%	+4.1%	--	--
Plan Chestnut	--	+0.6%	-1.5%	+2.3%	+4.0%	--	--

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 3 in Section III.2.D illustrated this regularity, using the election results from the 2018 U.S. Senate election. The horizontal axis showed the value of the median-mean difference, where greater values favor the GOP more. Nearly all 100,112 maps in the computational or public ensembles favor Republicans according to this measure. Values between 4% and 5% are typical. The three proposed plans are less favorable to Republicans (or, equivalently, more favorable to Democrats) than most others, with their values much closer to 0%.

Proportionality (D3), in contrast, captures one way in which redistricting maps favor Democrats. Since our election system favors parties that win more votes more than proportionally, 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 13 to Table 14 is due to the selection of election results used to compute them, the five statewide elections from 2016 and 2018 in Table 13 and the thirteen such elections from 2012 to 2020 in Table 14.

Third, Partisan Bias (D1) is another measure of symmetry that also reflects how the political geography of the state favors the GOP. As a result, under this measure and 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) compares the seat outcome to a benchmark based on county and city boundaries, which captures what would happen under a neutral electoral system designed without partisan considerations. According to this standard, all three plans perform very well, delivering approximately the same number of seats as the neutral benchmark.

The Outlier test (D7) finds a map unfair if the outcomes it generates are unusual, 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 12.
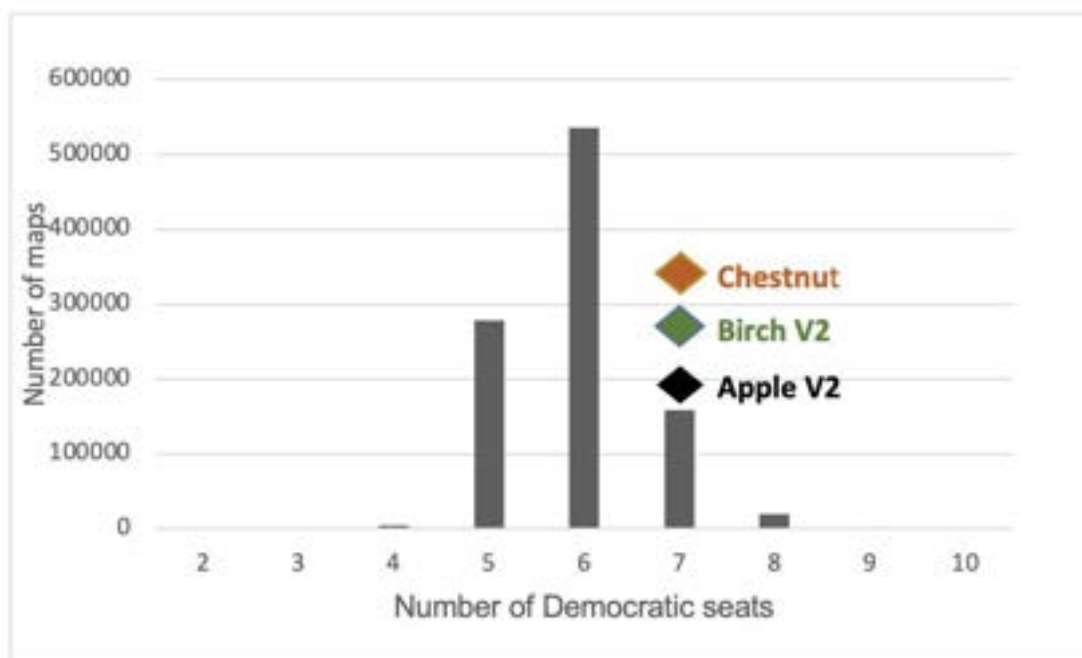

Figure 12. Outlier test (D7) for Congressional Maps

Figure 12 is copied from the Redistricting Report Cards elaborated by the Princeton Gerrymandering Project for these three maps. The horizontal axis in Figure 12 are numbers of seats that Democrats would win, in a hypothetical composite election with vote tallies that were equal to the average tallies of the most recent race for Michigan governor (2018), U.S. Senate in Michigan (2020) and U.S. President in Michigan (2020). The bars represent the number of maps (from among a million) in the Princeton Gerrymandering Project's ensemble in which Democrats would obtain such number of seats in such a composite election. The diamonds locate where the three Proposed maps in this distribution of columns. As desired by this test, the maps are not outliers; rather, they locate among the tall stacks at the center of the distribution. Most maps would give Democrats five, six or seven seats. These maps do too, and are thus fair according to this criterion.

All three plans feature six leaning, likely or safe Republican districts, six leaning, likely or safe Democratic districts, and a seventh, marginal district in the Capital region around Greater Lansing.

Five districts based in the Upper Peninsula (1); north-central-west Lower Peninsula (2); Southwest Lakeshore (3 or 4; number varies); Indiana border (5); and the Thumb (9) lean

Republican in all maps. Another five districts, around Ann Arbor (6), the Tri-cities and Flint (8), Oakland County (11), western Wayne County (12) and the city of Detroit (13) lean Democrat in all maps, albeit District 8 weakly so.

The sixth Republican-leaning district in plans Apple V2 and Chestnut is District 10 in Macomb County; in Plan Birch, District 10 has a different configuration that makes it lean Democrat, and instead, the 6th Republican-leaning district is District 3 around Grand Rapids. Plans Apple V2 and Chestnut tilt the Grand Rapids district Democrat by pairing Grand Rapids with Kalamazoo (Apple V2) or with Muskegon (Chestnut).

On any elections with a close to tied or slightly more Democratic vote share, as in the 2016 and 2020 Presidential elections, all three of these maps would be likely to generate 7-6 delegations, with either party capable of attaining a majority, depending on the outcome in the Capital Region district (7). At their recent electoral peak, under plans Apple V2 or Chestnut, Democrats could carry the Macomb-based district (8) and obtain an 8-5 majority. Republicans, at their recent electoral peak, could carry the Tri-Cities district (11) and obtain an 8-5 majority under plans Apple V2 or Birch V2. But a 7-6 majority on either side remains far more likely with any of these maps.

Considering a range of measures of partisan fairness, Plan Apple V2, Plan Birch V2, and Plan Chestnut are all fair to political parties. All three maps score within the range of acceptable values in every measure. Compared to maps not explicitly trying to achieve any partisan outcome, these maps are a bit more favorable than average to Democrats, but they fall within the middle range of normal maps. The same is true if we compare the Proposed maps 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.
We refer to the discussion under Section III.2.E.

Measures of fairness to candidates.
We refer to the discussion under Section III.2.E.

Results.
We present first results on double-bunking, i.e. assigning two incumbents to the same district.

TABLE 15. Districts with Two Incumbents in Proposed Congressional Plans	
Plan Apple V2	3 [4]
Plan Birch V2	3 [4]
Plan Chestnut	4 [4]

We present two numbers. The first uses the incumbents' addresses reported in the 2020 Candidate Listing made public by the MI Secretary of State. Using these addresses, the typical range in the computational ensemble is from 1 to 3, and in the public ensemble, from 2 to 4.

The second number, in brackets, is computed using incumbents' addresses obtained from the Michigan Voter file by Mike Wilkinson for Bridge Michigan.[35]

On competitiveness, all three plans have a competitive district (#7) in the Capital Region centered in the Greater Lansing area. District 8 (Tri-Cities Flint) in plans Apple V2 and Birch V2, and District 10 (Macomb County) in plans Apple V2 and Chestnut are somewhat competitive as well.

In the five elections used by MGGG to compute results for the ensembles (namely, the 2018 Senate, Governor, Secretary of State, and Attorney General elections, and the 2016 Presidential election), only one district in Plan Birch V2 ever switched, with six staying Democrat and six staying Republican throughout; two districts switched in Plan Apple V2, with six staying Democrat and five staying Republican throughout, and three switched in Plan Chestnut, with five staying with each of the two parties.

If we define a "competitive district" as one that each of the two parties won in at least one of the five elections in the MGGG data set, and we compare these results to those of the ensembles, Figure 13 shows that most maps feature at least two, three or four competitive districts. In other words, Plan Birch V2 features fewer competitive districts than most other maps, while Plan Apple V2 and Plan Chestnut are typical in this regard.

Plans Apple V2 and Birch V2 also feature fewer results decided by a less than 6% margin: 9 and 10, respectively, among 65 results (5 elections in each of 13 districts). Plan Chestnut features 13 competitive elections, more in line with most maps in the ensembles, which feature anywhere

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[35] Sergio Martinez-Beltrán and Mike Wilkinson, "Redistricting may oust half of incumbents in Michigan, analysis finds", November 23, 2021, Bridge Michigan.

between 12 and 22 competitive elections. Competitiveness is not a criterion in the Michigan Constitution, but too much or too little might be perceived as an environment that favors or disfavors incumbents as a class. In this regard, Plan Chestnut performs better, more like a typical plan, while Apple V2 and Birch V2 will feature more safe incumbents than most other maps.
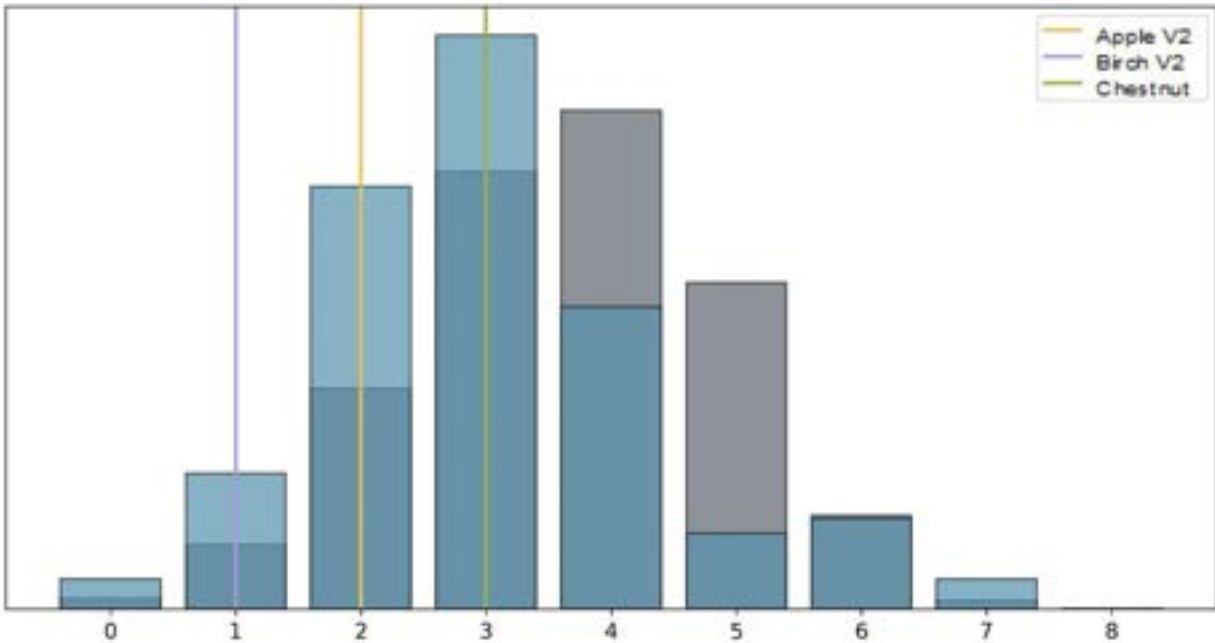

Figure 13. Number of Competitive Congressional Districts

CRITERION F: JURISDICTIONAL BOUNDARIES

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

Understanding the criterion.
We refer to the discussion under Section III.2.F.

Measures of respect for jurisdictional boundaries
The standard way to measure satisfaction of this criterion is to count the number of times that a single unit of government is split – or geographically subdivided into potentially smaller units. One could compute the minimum number of county, city and township splits, and 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 Michigan Constitution does not provide such weights.

We count:

E1. Number of counties that are split.

E2. Total number of times that counties are split, resulting in the total number of pieces of each county assigned to different districts.

E3. Number of U.S. Census "County Subdivisions" (COUSUB variable in the Census data; typically, cities, towns, and townships) that are split.

E4. Total number of times that county subdivisions are split, resulting in the total number of pieces of each county assigned to different state House, state Senate or U.S. Congressional Districts.

Results.
We first present the results in table format.

TABLE 16. Split Jurisdictions and Jurisdictional Splits				
	Split Counties	Number of Pieces	Split Municipalities	Municipality Pieces
Plan Apple V2	18	40	40	98
Plan Birch V2	13	31	39	98
Plan Chestnut	14	34	38	91
2011 Map	10	14	n.a.	n.a.

These maps, and specially Plan Apple V2, do a poor job at respecting county boundaries compared to the map adopted in 2011. We also compare these three maps to the ensembles.

It is important to note here that the computational ensemble aims to preserve counties, but is entirely oblivious to municipal boundaries.[36] Therefore, the computational ensemble offers a benchmark of comparison with complete disregard to city and township boundaries (the maps ought to outperform this benchmark), and a more challenging benchmark with 100,000 maps that tried moderately hard to keep counties intact. The MICRC maps may not do as well if counties

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[36] Informally, the algorithm that generates maps may be thought of as treating a boundary that cuts through a county as three times more economically costly than one that goes along the borders, and trying to keep the total cost of these boundaries low.

are split to satisfy higher ranked criteria (which are not included aside from population equality by the computational algorithm). No such consideration applies to the public ensembles; public submissions may or may not follow city, county, city or township boundaries.

As Figure 14 shows, these maps do not reflect county boundaries as well as those in the computational ensemble; but Plan Birch V2 and Plan Chestnut perform about as well as the maps submitted by the public; Plan Apple V2 underperforms Birch V2, Chestnut, and most of the maps submitted by the public.
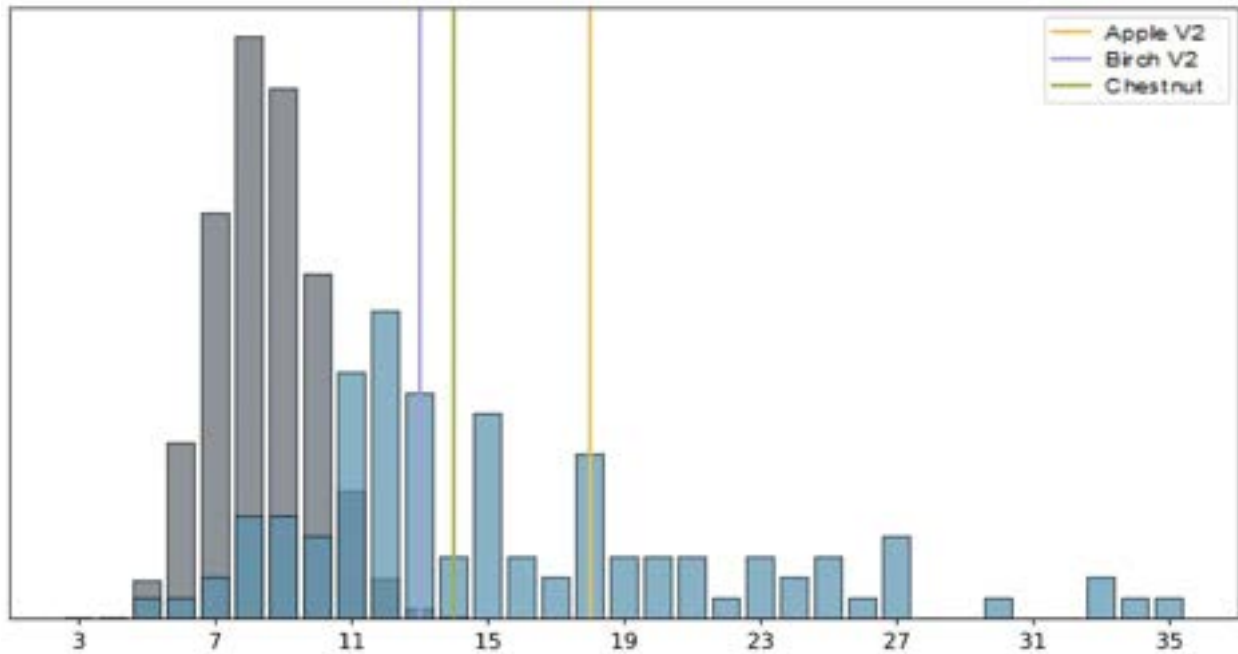
Figure 14. Number of Split Counties

As shown in Figure 15, all three MICRC Proposed plans reflect city and township boundaries about as well as is typical of maps submitted by the public, and better than the computational benchmark that was entirely unaware of municipalities. This indicates that the MICRC has taken municipal boundaries into account. We infer that the MICRC has also taken county boundaries into account, though not as much perhaps as the 2011 plans or computer-generated plans. It is relevant to this comparison that neither 2011 mapmakers nor the computational algorithm were required to consider additional criteria reflecting communities of interest or partisan fairness that currently take precedence over respect for boundaries in the current redistricting round.
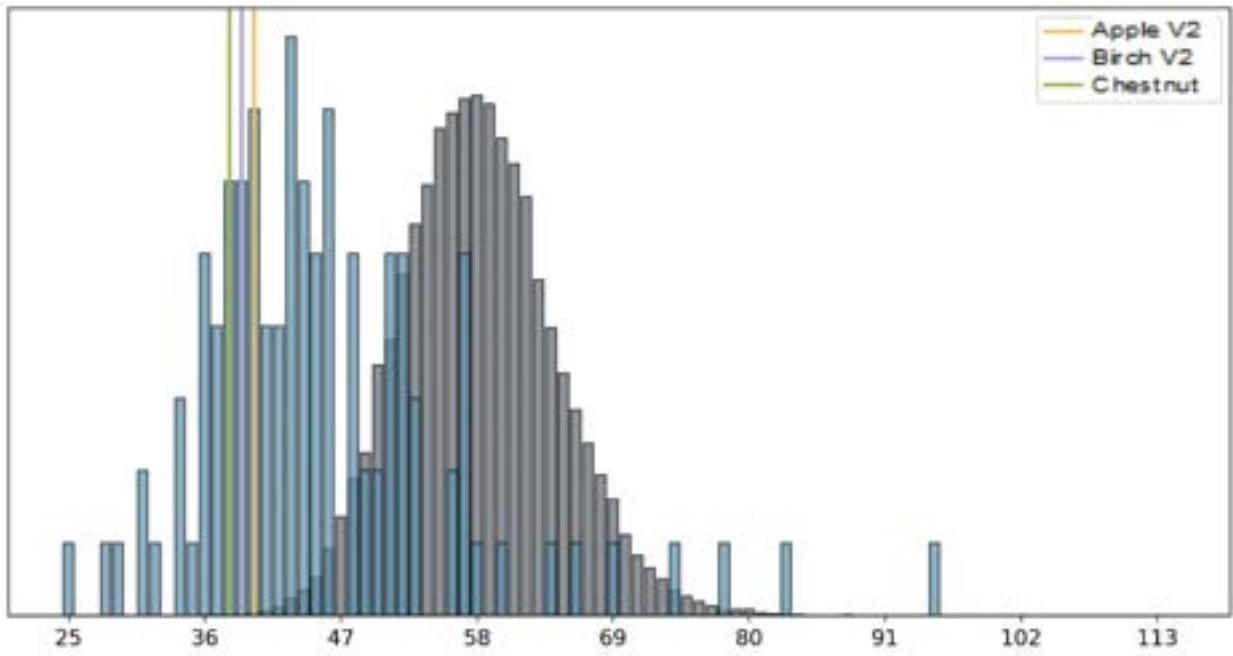
Figure 15. Number of Split Municipalities (County Subdivisions)

CRITERION G: COMPACTNESS

"Districts shall be reasonably compact."

Understanding the criterion.
We refer to the discussion under Section III.2.G.

Measures of compactness.
We refer to the discussion under Section III.2.G.

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.[37]

TABLE 17. *Compactness Measures in Congressional District Plans*			
	Polsby-Popper	Reock	Cut Edges
Plan Apple V2	0.38	0.37	710
Plan Birch V2	0.39	0.40	685
Plan Chestnut	0.39	0.38	700
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 V2 slightly underperforms the others.

All three maps are reasonably compact, much more so than the official map in the previous redistricting sample, and about as much as most maps in the Ensemble group, as illustrated in Figure 16.

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[37] The Reock and Polsby-Popper measures are as reported by DRA 2020. The Cut Edges measure is computed by MGGG for this report.
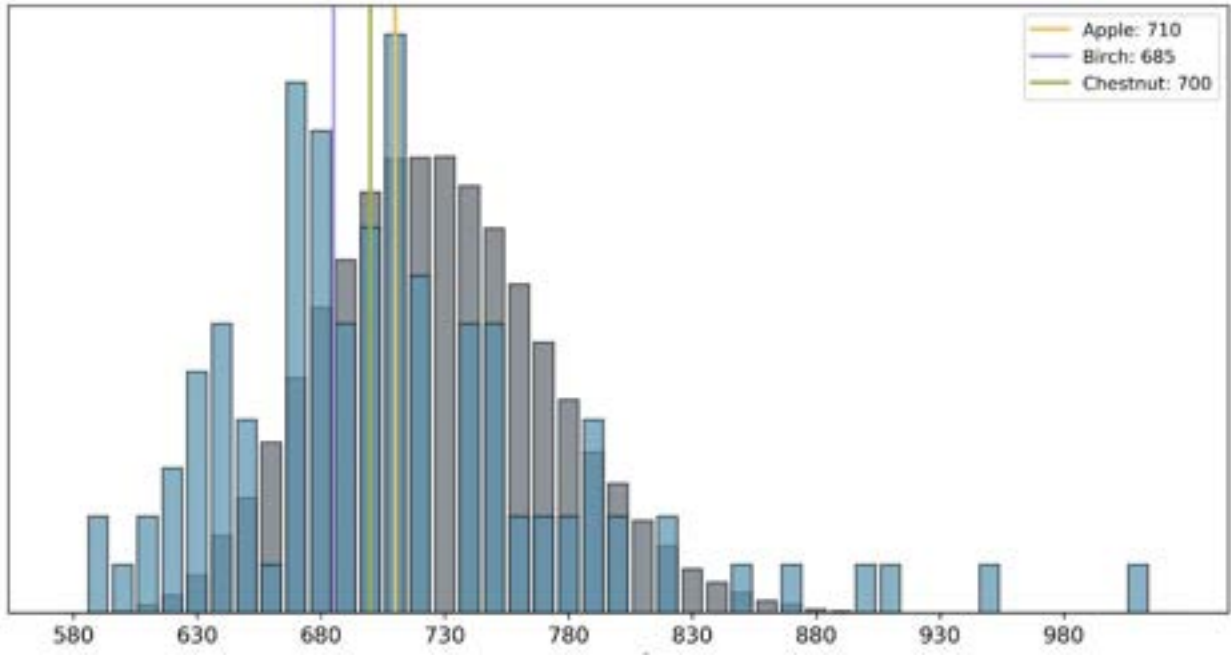
Figure 16. Number of Cut Edges

III.3. SUMMARY OF RESULTS AND PLAN COMPARISON

Plan Apple V2, Plan Birch V2, and Plan Chestnut are all complete redistricting plans that divide the entire state into 13 districts, as required by the latest U.S. Census of the state.

Plan Chestnut features a small deviation from population equality: 0.14%, or just over 1,000 inhabitants, which is less than the size of a typical voting precinct. Plan Birch V2 features a twice as large deviation: 0.28% or just over 2,000 inhabitants; close to the size of the average voting precinct. Plan Apple V2 features a substantially larger population deviation: 0.48%, or over 3,700 inhabitants, which is a greater population than the population in most voting precincts in Michigan. These differences across the three plans are large relative to the magnitude of the deviations exhibited in Congressional District plans across all states. Therefore, on population equality, Plan Chestnut performs significantly better than either Plan Birch V2 or Plan Apple V2, and Plan Apple V2 underperforms either of the other two.

None of these three plans feature a district in which a majority of the Voting Age Population identifies as "Black." All three plans feature two districts with at least 40% Black Voting Age Population, but Plan Chestnut features two districts with greater than 43% Black Voting Age Population. Therefore, Plan Chestnut provides stronger and safer districts of opportunity for the Black minority population to elect candidates of its choice.

Plan Chestnut, therefore, outperforms Plan Birch V2 and Plan Apple V2 with regard to all aspects of Criterion A.

All three plans satisfy contiguity.

While all three plans feature districts that represent geographically recognizable areas that can be meaningfully described in few words, we cannot say that they fully reflect the collection of Communities of Interest submitted by citizens. There are slight variations between the plans in their preservation of COI clusters, but none perform significantly better than most randomly-drawn maps.

All three plans perform well overall according to a collection of accepted measures of partisan fairness.[38] Under any of these three plans, and with election results similar to those in the recent past, the most likely outcome would be a congressional delegation with a 7-6 or 6-7 Democratic-Republican partisan split.

Plan Chestnut features a normal number of districts and elections in which the incumbent party has lost or come close to losing. This number is typical in maps drawn by the public or by computational algorithms that did not take incumbency into account. Plans Apple V2 and Birch V2 feature relatively few districts and few elections in which the incumbent party has lost or has come close to losing, so they may be regarded as plans that relatively favor incumbents.

Plans Chestnut and Birch V2 reflect county, city and township boundaries more closely than Plan Apple V2.

All three maps are reasonably and similarly compact; Plan Birch V2 slightly more so.

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[38] 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.

Proposed Plan Apple V2 is immediately derived from the earlier Draft Plan Apple, with some adjustments that lowered population equality scores. The plan's score was lowered by adding Koylton Township to the now-largest district (District 9), and taking half of Lyndon Township out of what is now the smallest district (District 6). Notably, each of the two assignments also create a county split, also lowering performance on Criterion F.

Proposed Plan Birch V2 is immediately derived from the earlier Draft Plan Birch, with some adjustments to the district boundaries around the city of Midland that did not materially affect any of the compliance.

Proposed plans Apple V2, Apple, Birch V2 and Birch are all ultimately variations rooted on a shared draft, and their commonalities remain visible in many of their districts. We find that the changes from Draft Apple to newer Proposed Apple V2 actually lowered rather than improved performance on Criteria A and F.

Proposed Plan Chestnut offers more differences. It is originally rooted in, or at least inspired by, the same draft that is a common predecessor to Apple and Birch and the newer Apple V2 and Birch V2.

In each, the basic configuration outlines District 1 in the Upper Peninsula and the northern Lower Peninsula (including Marquette and Traverse City); District 2 in the mid/central/northern Lower Peninsula (including Mt. Pleasant); District 3 or 4 around Grand Rapids; District 4 or 3 on Michigan's southwestern lakeshore; District 5 along the state's southern border; District 6 around Ann Arbor; District 7 based on the Capital Region around Greater Lansing; District 8 including the Tri-cities and Flint; District 9 covering the Thumb; District 10 taking in much of the population of Macomb County; District 11 based on Oakland County; District 12 in western Wayne County; and District 13 in and around the city of Detroit. This framework is common to all three plans and all their predecessors.

The most distinctive geographic feature of Apple and newer Apple V2 turns the Grand Rapids district into a north-south strip that brings in Kalamazoo and leans Democratic. The most distinctive feature of Birch and the updated Birch V2 is that they move the Macomb County district (District 10) westward into Oakland County and turn it into one that leans Democratic. Plan Chestnut's most geographic distinctive feature is arguably its solution for the Grand Rapids district, stretching the district to Lake Michigan at Muskegon and yielding a district that tilts toward the Democratic Party. Plan Chestnut also introduces many other border adjustments. The overall effect of these changes improves population equality and strengthens the two districts of opportunity.

In summary, Plan Chestnut performs better than the other two plans on the top-ranked Criterion A (population equality and compliance with the Voting Rights Act). It performs at least as well or better than Plan Birch V2 in most other criteria, and at least as well or more sharply improved than Apple V2 on most other criteria.

Overall, we conclude that, across our measures, Plan Chestnut performs best on these seven ranked criteria, with Plan Birch V2 second best, and Plan Apple V2 ranked lowest of the three.

We next reorganize the material above, reiterating the key points by plan, instead of by criterion, and discussing possible concerns or considerations about these plans.

Proposed Plan Chestnut.

Proposed Plan Chestnut features a small population deviation at 0.14%. It features two districts of opportunity in which the share of Voting Age Population that identifies as "Black" is above 43%.

This plan performs well on a collection of partisan fairness measures, and on fairness to candidates. It shows some consideration for county, city and township boundaries and is reasonably compact.

The small population deviation from equality would need to be justified as necessary to satisfy other criteria. Since the deviation is smaller than the population size of most precincts, greater population equality may require breaking up a precinct. However, since this plan follows pre-existing precinct lines (which helps with compliance with the VRA), the deviation can probably be justified as stemming from a desire to preserve whole precincts, which in and of itself helps satisfy other criteria.

Given public concern about the Commission's approach to Black representation, the Commission may need to explain that this plan complies with the Voting Rights Act by creating two districts of opportunity in which voting-age residents who identify as "Black" constitute more than 43% of the population of the district.

Proposed Plan Birch V2.

Proposed Plan Birch V2, compared to Proposed Plan Chestnut, features a larger population deviation, at 0.28%. It features two districts of opportunity in which the share of Voting Age Population that identifies as "Black" is above 40% but below 43%.

It performs well on a collection of partisan fairness measures. It performs less well on measures of fairness to candidates, as it appears to create many seats that will be safe to incumbents. It shows some consideration for county, city and township boundaries, and is reasonably compact.

The larger population deviation from equality would need to be justified as necessary to satisfy other criteria. This might be more difficult, given that Proposed Plan Chestnut exists as an alternative.

It outperforms other maps on compactness, the lowest ranked of the criteria.

Plan Apple V2.

Plan Apple V2 features a much larger population deviation of 0.48%. It features two districts of opportunity in which the share of Voting Age Population that identifies as "Black" is above 40% but below 43%.

It performs well on a collection of partisan fairness measures. It performs less so on fairness to candidates, as it appears to create districts that will see very few competitive elections. County, city and township boundaries are less favored and the updated Apple map appears slightly less compact than the other two alternatives.

Since it performs no better than the other plans on any criteria, based on our measures, it appears much more difficult to justify why the large population deviation present in this plan is necessary to satisfy some other of the state's redistricting criteria.

We next provide an abridged analysis of individually submitted congressional plans in an Appendix to Part IV within this report.

IV. APPENDIX. PROPOSED CONGRESSIONAL PLANS SUBMITTED BY INDIVIDUAL COMMISSIONERS.

There are two individual commissioner submissions for congressional District plans:

- Proposed Szetela Congressional District Map Number #275, submitted by Commissioner Rebecca Szetela, Independent, of Canton.
- Proposed Lange Congressional District Map Number #273, submitted by Rhonda Lange, Republican of Reed City.

Proposed congressional District Map Szetela incorporates the Grand Rapids area districts from Plan Chestnut with the remaining districts from Plan Birch V2.

Proposed congressional District Map Lange keeps the overall framework of Plan Birch V2 and keeps its six districts around Washtenaw, Wayne, Oakland and Macomb counties and the thumb intact, but makes considerable border adjustments elsewhere.

TABLE 10 Appendix. *Population Equality in Proposed Congressional Individual Plans*		
	Population difference	**Maximum. Deviation**
Plan Apple V2	0.48%	0.26%
Plan Birch V2	0.26%	0.15%
Plan Chestnut	0.14%	0.08%
Plan CD Lange 273	0.25%	0.15%
Plan CD Szetela 275	0.22%	0.12%

Plan Chestnut continues to outperform all other plans on population equality once we take into consideration the two individual submissions.

TABLE 11 Appendix. *Districts of Opportunity in Proposed Congressional Individual Plans*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Apple V2	0	2	2
Plan Birch V2	0	2	2
Plan Chestnut	0	2	2
Plan CD Lange 273	0	2	2
Plan CD Szetela 275	0	2	2
2011 Official map	2	2	2
Proportional to Population		2	

On VRA, plans CD Lange 273 and CD Szetela 275 follow Plan Birch V2 in the Greater Detroit and surrounding areas, and thus obtain the same scores on districts of opportunity as Plan Birch V2. Again, we prefer Plan Chestnut. Both individually submitted plans satisfy contiguity.

TABLE 13 Appendix. *Partisan Fairness in Proposed Congressional Individual Plans*				
	Efficiency Gap	Proportionality	Median-mean	Partisan Advantage
	D2	D3	D4	D6
Plan Apple V2	+1.2%	+0.14 seats	+2.4%	+0.06 seats
Plan Birch V2	+0.7%	+0.14 seats	+2.2%	+0.06 seats
Plan Chestnut	+0.6%	–0.20 seats	+2.3%	–0.28 seats
Plan CD Lange 273	+1.0%	+0.47 seats	+2.0%	+0.39 seats
Plan CD Szetela 275	+0.6%	-0.03 seats	+2.4%	–0.11 seats

Both of the individually submitted plans perform similarly to the collaborative ones on partisan fairness measures, albeit CD Lange 273 is slightly more favorable to Republicans.

TABLE 16 Appendix. Split Counties and County Splits in Proposed Congressional Maps.		
	Split Counties	County Pieces
Plan Apple V2	18	40
Plan Birch V2	13	31
Plan Chestnut	14	34
Plan CD Lange 273	13	31
Plan CD Szetela 275	17	39

Plan CD Lange 273 splits counties as much as much as Plan Birch V2; Plan CD Szetela inherits the county-splitting configuration of Plan Apple V2 around Grand Rapids and Kalamazoo. Plan CD Lange 273 is the best performing on compactness, together with Plan Birch V2, whereas, Plan CD Szetela 275 is the worst performing map on compactness.

| TABLE 17 Appendix. Compactness Measures in Proposed Congressional maps		
	Polsby-Popper	Reock
Plan Apple V2	0.38	0.37
Plan Birch V2	0.39	0.40
Plan Chestnut	0.39	0.38
Plan CD Lange 273	0.38	0.41
Plan CD Szetela 275	0.37	0.37

The results on Tables 10 Appendix, 11 Appendix and 31 Appendix are from DRA 2020, using the 2020 U.S. Census population data. On Table 13 Appendix, the measures for the Efficiency Gap and the Median-Mean difference are from the MICRC Compliance Sheet, using all 10 statewide elections from 2012 to 2020; and the deviation from proportionality and the Partisan Advantage are computed by Dr. Christian Cox of Yale University and based upon 2016 and 2020 presidential elections and the 2014, 2016, 2018 and 2020 U.S. House election in Michigan. Deviations from proportionality or from the neutral jurisdictional benchmark in the partisan advantage are measured in seats; whereas, the Efficiency Gap and the Median-Mean measure differences in shares of votes.

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

V.1. THE DRAFT MICHIGAN SENATE DISTRICT MAPS

On Oct. 11, 2021 the MICRC approved the following Draft maps for Michigan Senate districts, for consideration in the Second Round of Public Hearings (Oct 20 – Oct 27, 2021): [39]

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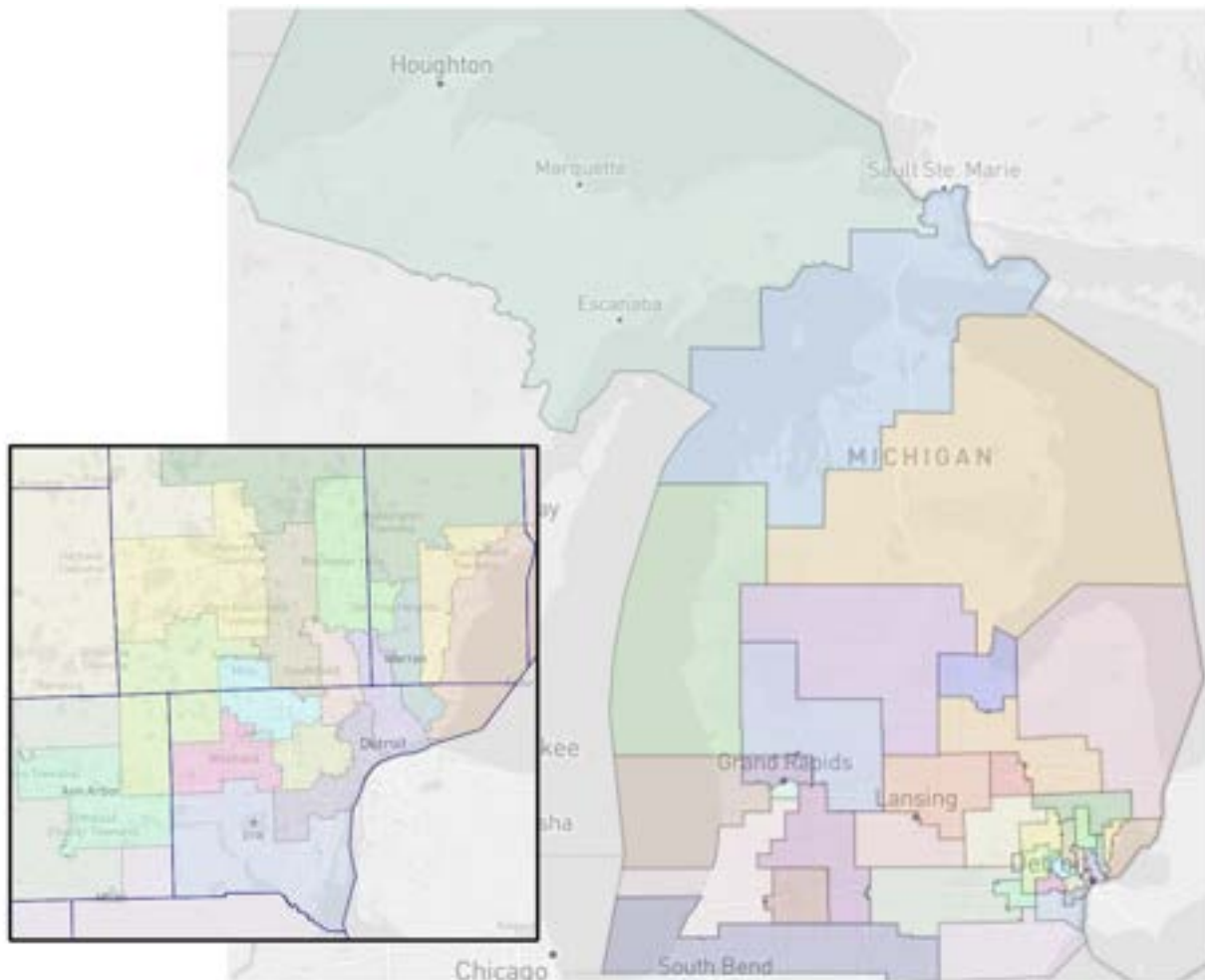
Plan Spruce

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[39] 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).[40] This block has 13 inhabitants.

Plan Elm

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[40] https://tigerweb.geo.census.gov/tigerweb2020/
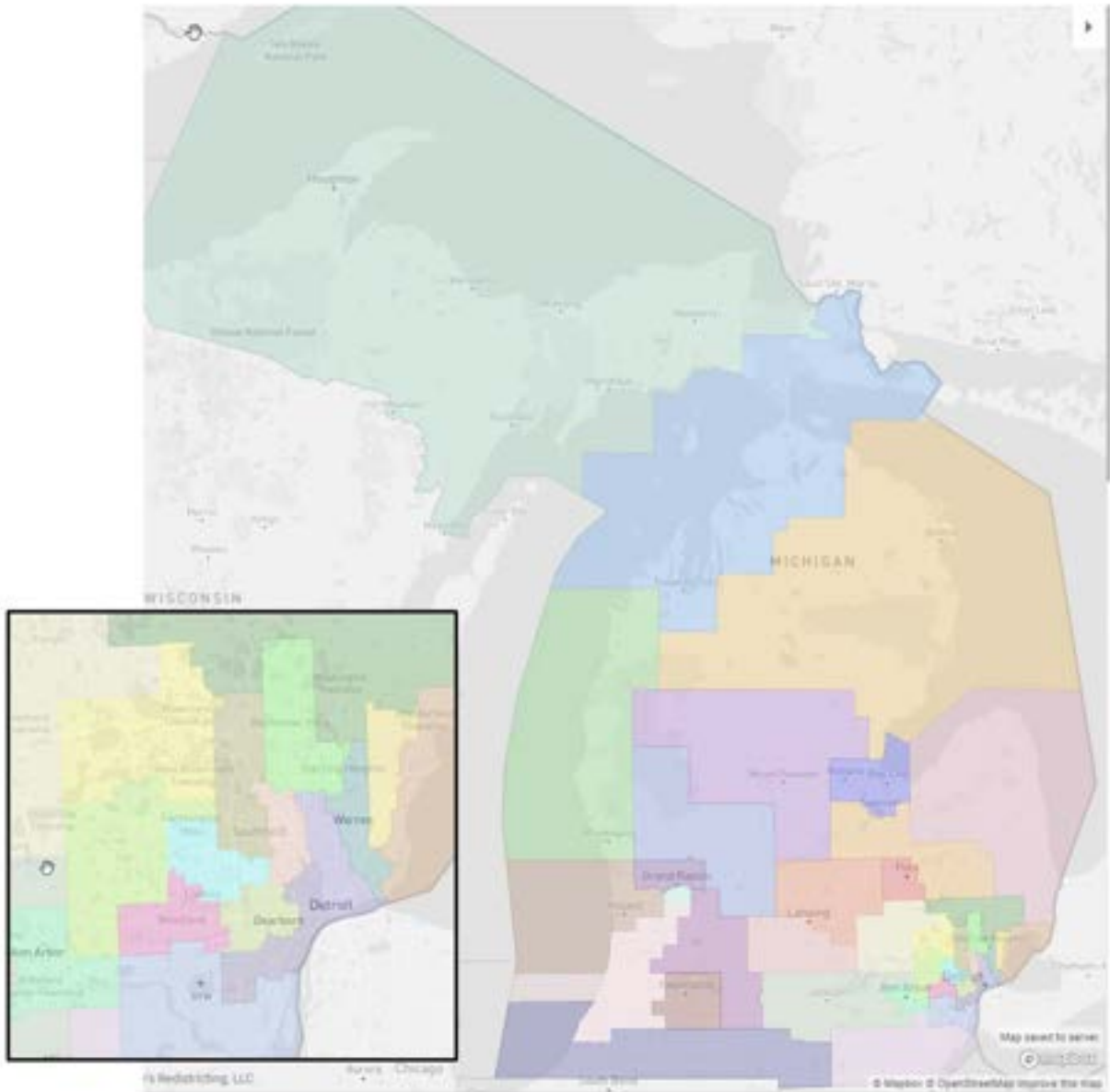
-Plan "Cherry," name 10-07-21 SD RAS BK (map number #220). Voted for publication 13-0.

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.
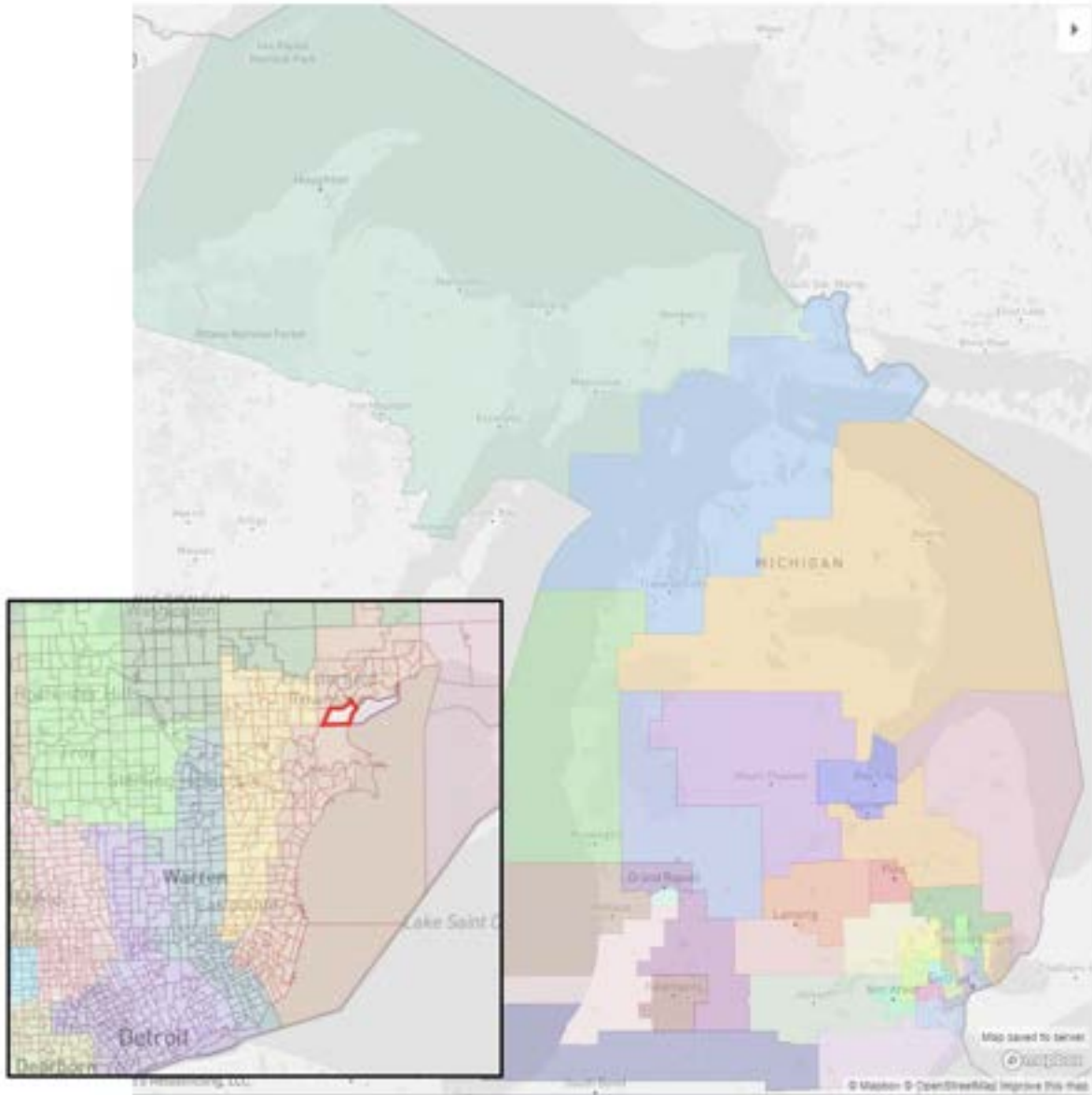
Plan Cherry (incomplete)

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 U.S. 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 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] However, the Equal Population federal requirement under the U.S. Constitution is much tighter for federal elections to the U.S. 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 District map).

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

In explicitly mentioning "equal population as mandated by the U.S. Constitution" as the first clause of the top priority criterion, the Michigan Constitution might open a question as to whether this clause means no more than the lax standard of equal population for state legislative districts under the U.S. Constitution (our interpretation), a 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 District maps.

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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

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,

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

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 state Senate districts. Further, 5.6% of the Michigan population is Hispanic or Latino, a percentage that corresponds to two state Senate districts (though in this case the highest concentration by county is 15.4% in Oceana County.); and 3.3% of the state population is Asian-American (with 9% in Washtenaw County.), a percentage that corresponds to one state Senate 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 Michigan 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 18. *Population Equality in Draft Senate Plans*			
	Population. difference	**Maximum. 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 (with official map numbers from IPUMS NHGIS, University of Minnesota, www.nhgis.org, that reflect current numbers rather than those at adoption). These numbers, serve as proxy for the number of Black-minority districts of opportunity.

TABLE 19. *Black Minority Districts of Opportunity in State Senate Draft 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	1	5	5
Proportional to Population		5	

As in the case of the Congressional District maps, the most striking result is no majority-minority districts in 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 unusual maps such that only 2.5% of maps have shares above or below the range covered by the arms.
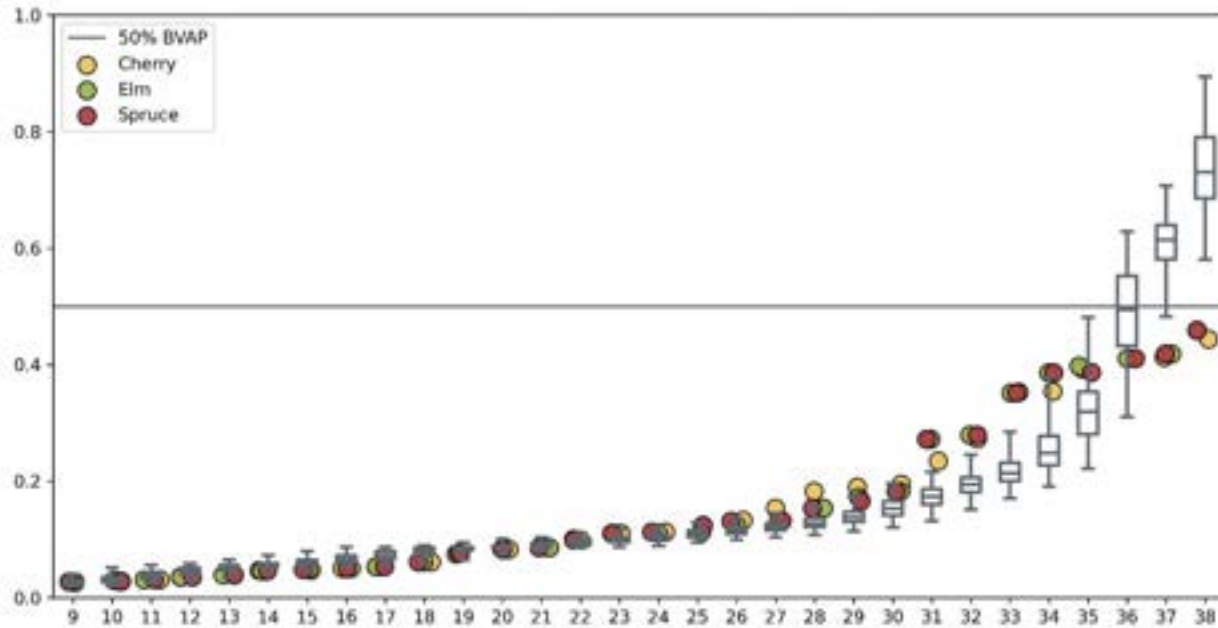

Figure 17. Distribution of Black VAP by Senate District

As we can see, these three Senate plans are unusual in engineering maps without a single majority-Black district. Almost all Senate maps in the Computer Ensemble feature two majority-Black districts; and 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 three 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 from its Voting Rights Act legal counsel and 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.

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 Michigan Senate maps satisfy contiguity.

TABLE 20. *Contiguity in Draft Michigan Senate maps*	
	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.

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

Results.
All of the draft plans preserve 26 COI clusters out of 34 at the 90 percent inclusion criteria. Many computer-generated maps include fewer, so each map shows some evidence of taking COI clusters into consideration.
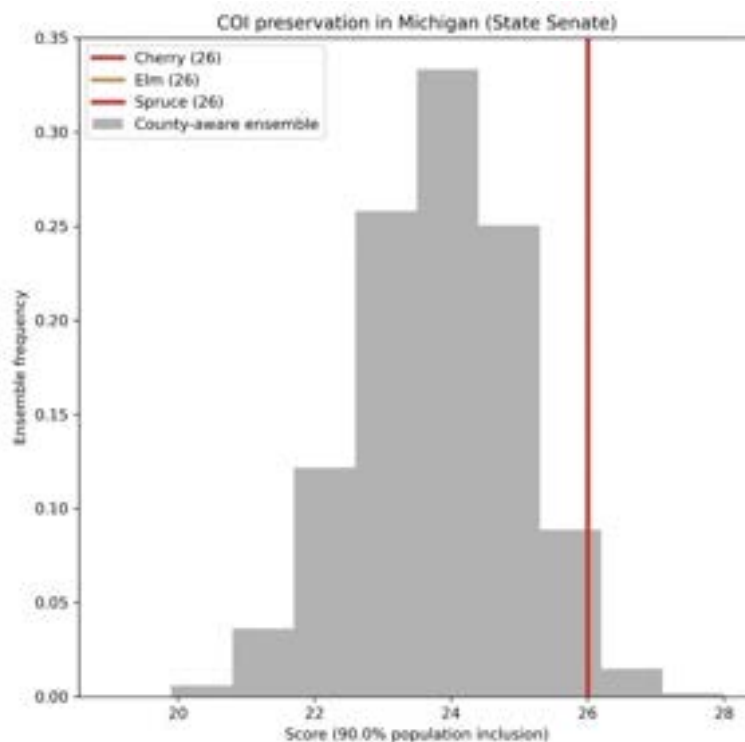

Figure 18. Community of Interest Preservation in State Senate Maps

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-D3 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 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.[46] 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 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

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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.

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 considers 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 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:

Michigan's 2018 Governor election; the 2018 Secretary of State election; the 2018 Attorney General election; the 2016 Presidential election; and the 2018 U.S. 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). 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). For all these measures, we compute results election by election, and then we average out. The Princeton Gerrymandering Project uses the 2018 Michigan Governor, 2020 U.S. Senate and 2020 U.S. Presidential election, first averaging them out to construct an electoral

composite in each precinct, and then using this composite to compute the results reported under the Outlier Test (D7).

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 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 votes. The "Outlier" (D7) indicates a party ("D" for Democratic or "R" for Republican) and a range of percentages. The letter indicates the party that this map favors, relative to the 1,000,000 other maps in the Princeton Gerrymandering Project ensemble. The first number is the share of maps in the ensemble that are less favorable to this party (in the sense that the party would obtain fewer seats), and the second is the share of maps that are even more favorable (in the sense that the party would obtain more seats).

TABLE 21. *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	D: 85%-3%
Plan Elm	+5.3%	+3.1%	-0.3 seats	+3.5%	+5.2%	+0.2 seats	D: 85%-3%
Plan Cherry[*]	*+2.7%*	*+2.5%*	*-0.5 seats*	*+2.8%*	*+4.5%*	*−0.3 seats*	D: 97%-0%

[*] 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, U.S. Senate, Governor, Secretary of State, and State Attorney General) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 22. *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 19 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 with these election results, they are within the normal range, not extreme outliers. The public and computer ensembles both produce more maps that would favor Republicans more than these.
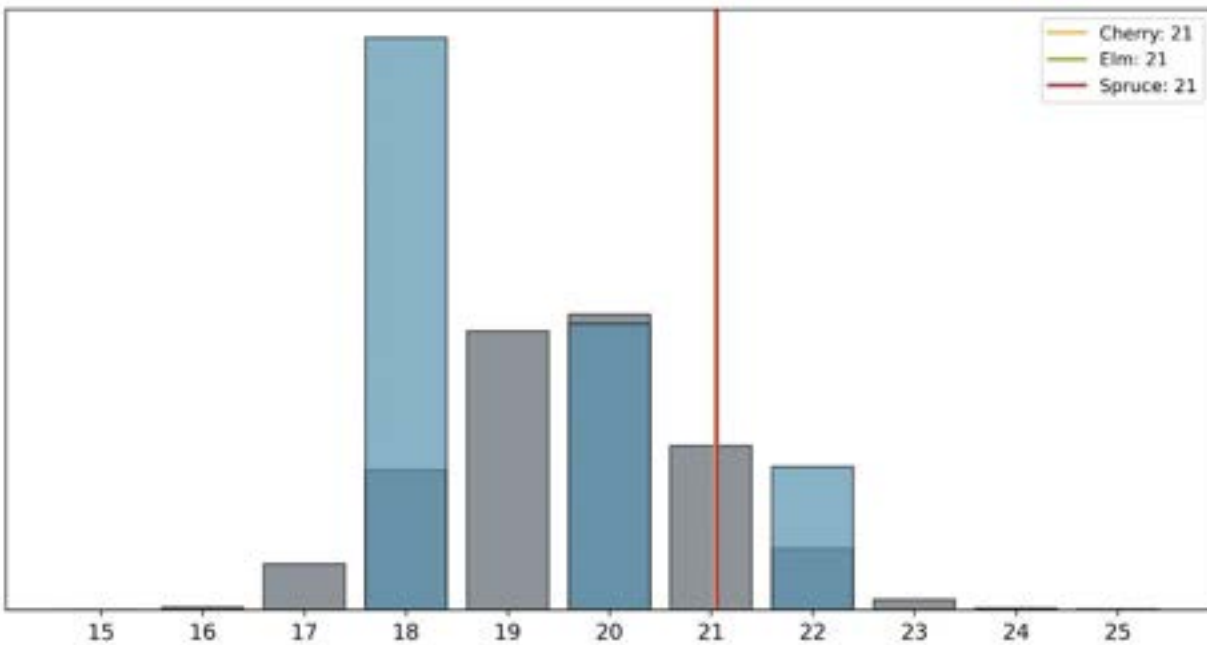

Figure 19. Number of Seats Democrats would Win with Senate 2018 Results

Figure 19 illustrates outcomes under one particular election result. Under other election results in our sample, Democratic candidates win an additional seat under Plan Cherry.

Overall, the Spruce and Elm 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.

Plan Cherry introduces some questions: while it appears to favor Republicans on some measures, it also appears to be an unusual map in favor of Democrats according to the outlier test, as conducted by the Princeton Gerrymandering group.

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 U.S. 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.[47] 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 U.S. House, candidates for a seat in the Michigan Senate must be registered voters in the district they seek to represent.[48] 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) can be seen in the histogram below. The Tree maps keep fewer districts from double bunking incumbents. Cherry, Spruce, and Elm maps each double bunk 6 incumbents. That is fewer than would be expected by chance and fewer than most publicly-generated maps.

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[47] Mich. Constitution, Article IV § 54.
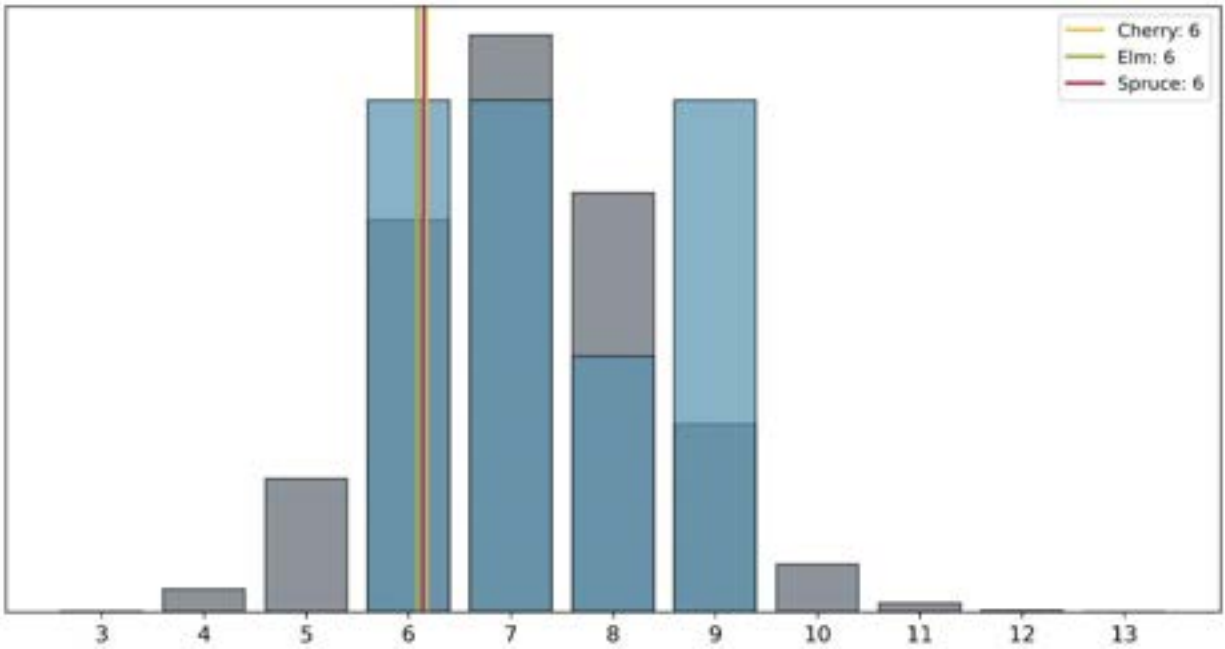[48] Mich. Constitution, Article IV § 7.

Figure 20. Double Bunked Incumbents in State Senate Maps

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.
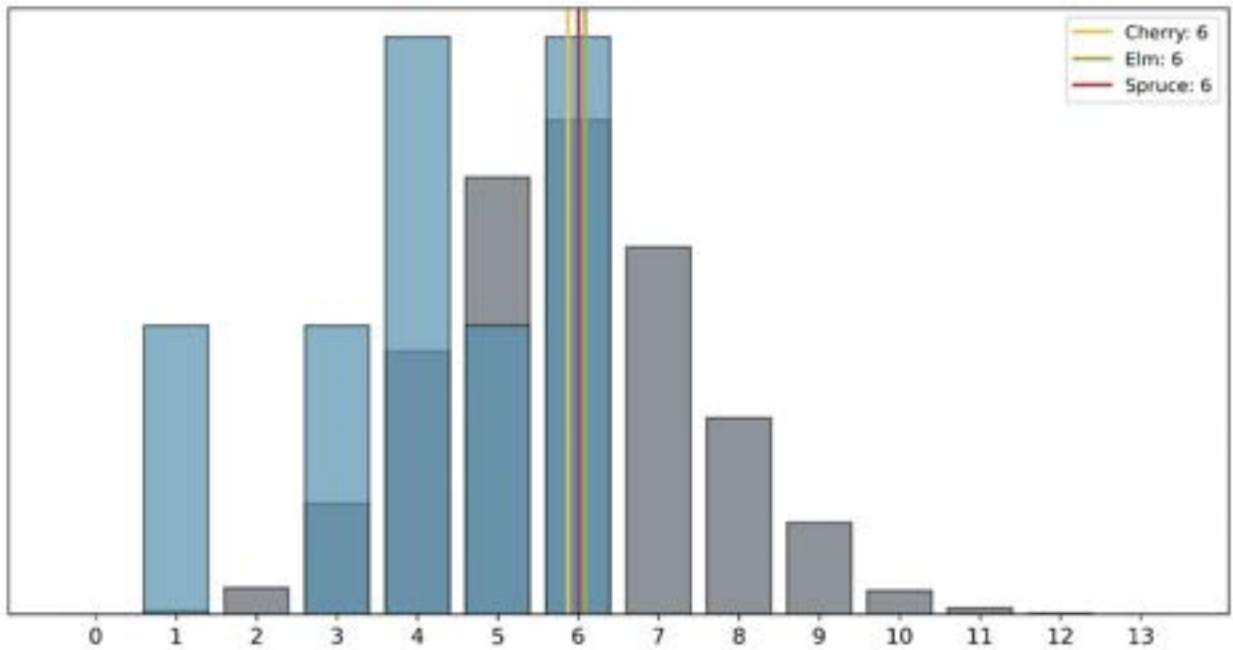

Figure 21. Number of Swing Senate Districts

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.

TABLE 23. 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 outlier. These findings are illustrated in Figure 22. 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.
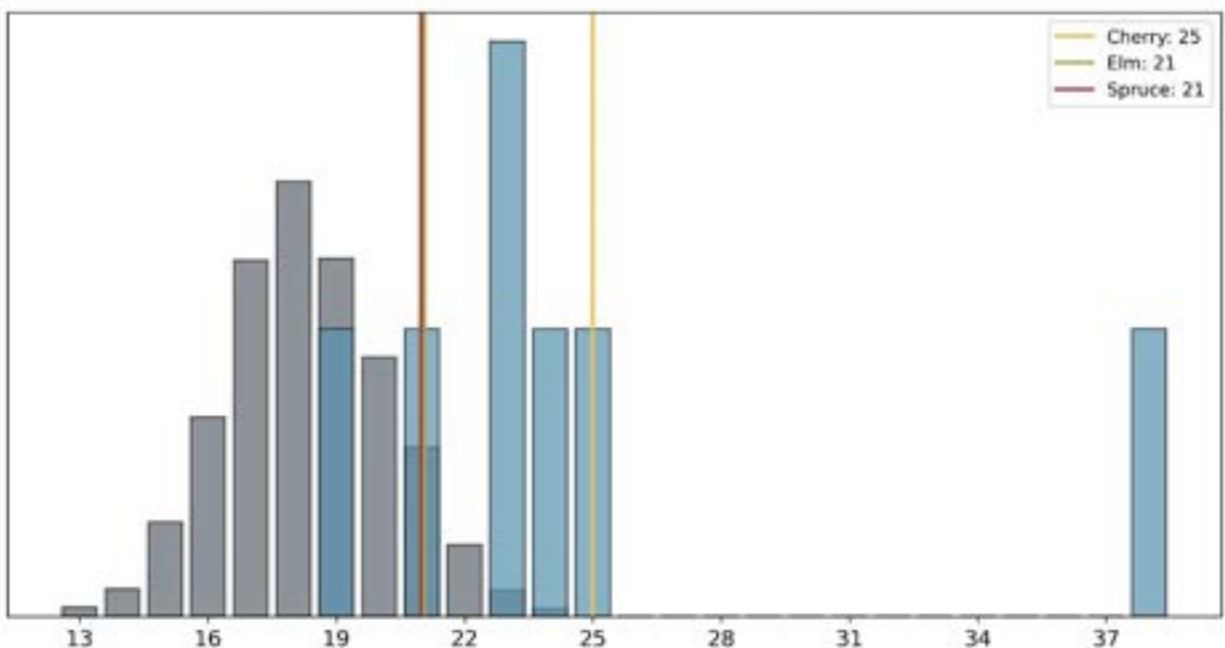

Figure 22. Split Counties in Senate Maps

As indicated by the histogram below, the Tree maps split municipalities far less than the computer-generated maps do and fewer than most publicly-drawn maps. Cherry splits 57 municipalities while Elm and Spruce split 53 each.
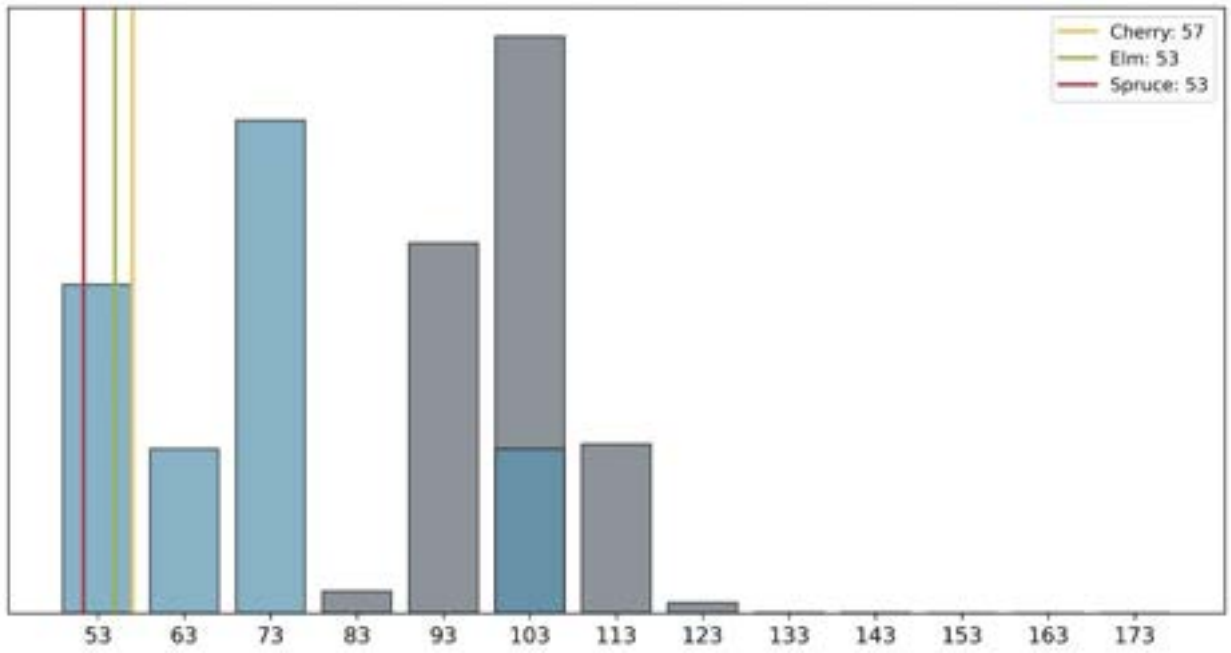

Figure 23. Number of Split Municipalities in State Senate Maps

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 24. 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 24.
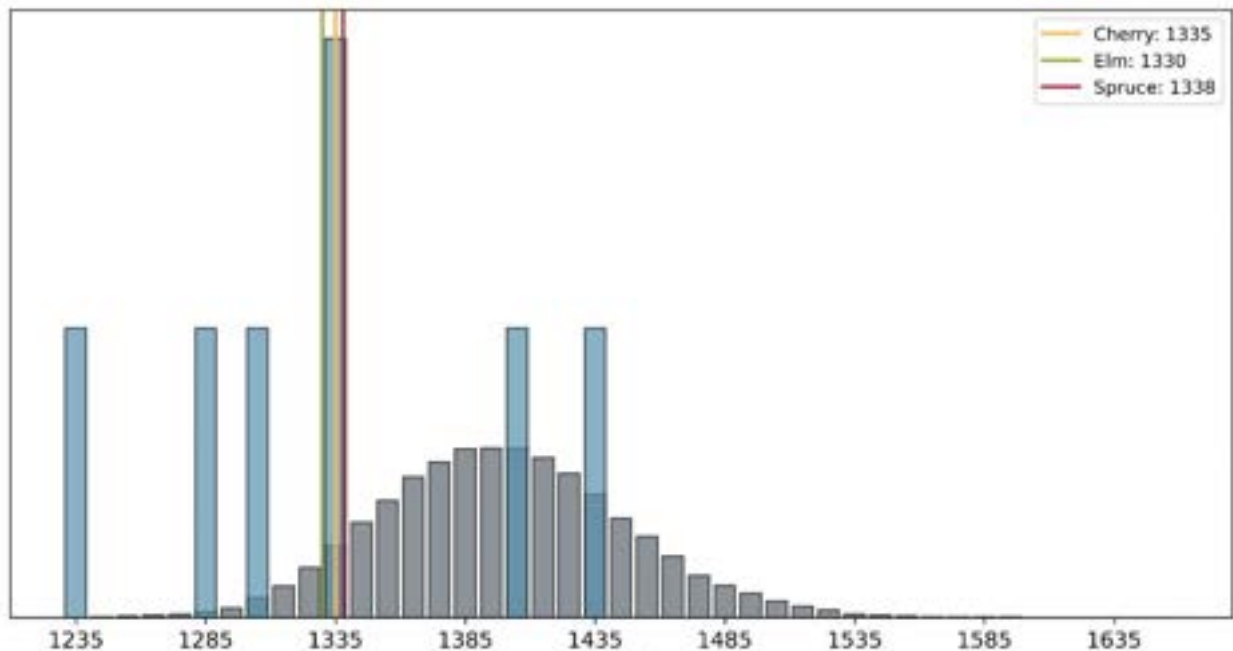

Figure 24. Number of Cut Edges in Senate District Plans

V.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. The maps reflect more Community of Interest clusters than computer-generated maps.

All three plans perform well overall according to a collection of accepted measures of partisan fairness.[49] 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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[49] 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. ANALYSIS OF PROPOSED MAPS FOR MICHIGAN'S SENATE DISTRICTS

VI.1. THE PROPOSED MICHIGAN SENATE DISTRICT MAPS

On Nov. 1, 2017 the MICRC approved the following Proposed map for Michigan Senate districts for consideration in the final round of public hearings now set for (Nov 15 – Dec 29, 2021): [50]

-**Plan Cherry V2** (map number #251). Voted for publication 11-2 (Commissioners Kellom (D) and Lange (R) opposed).
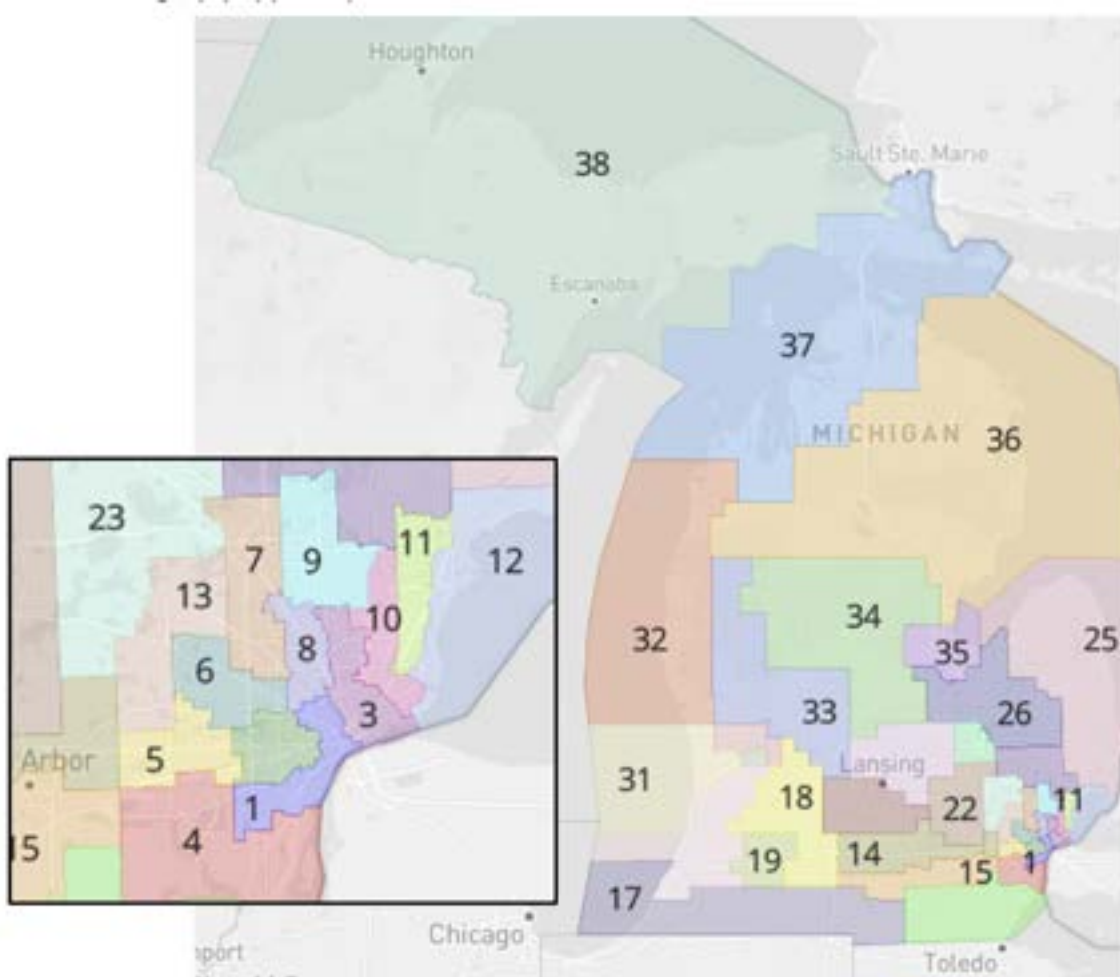
Plan Cherry V2

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

On Nov. 4, 2021, the MICRC approved the following Proposed maps for Michigan Senate districts to be forwarded for what is expected to be the final round of Public Hearings now scheduled for Nov 15 – Dec 29, 2021): [51]

-**Plan Linden** (map number #260), voted 11-2 for publication. Opposed: Commissioners: Lange (R) and Wagner (R).
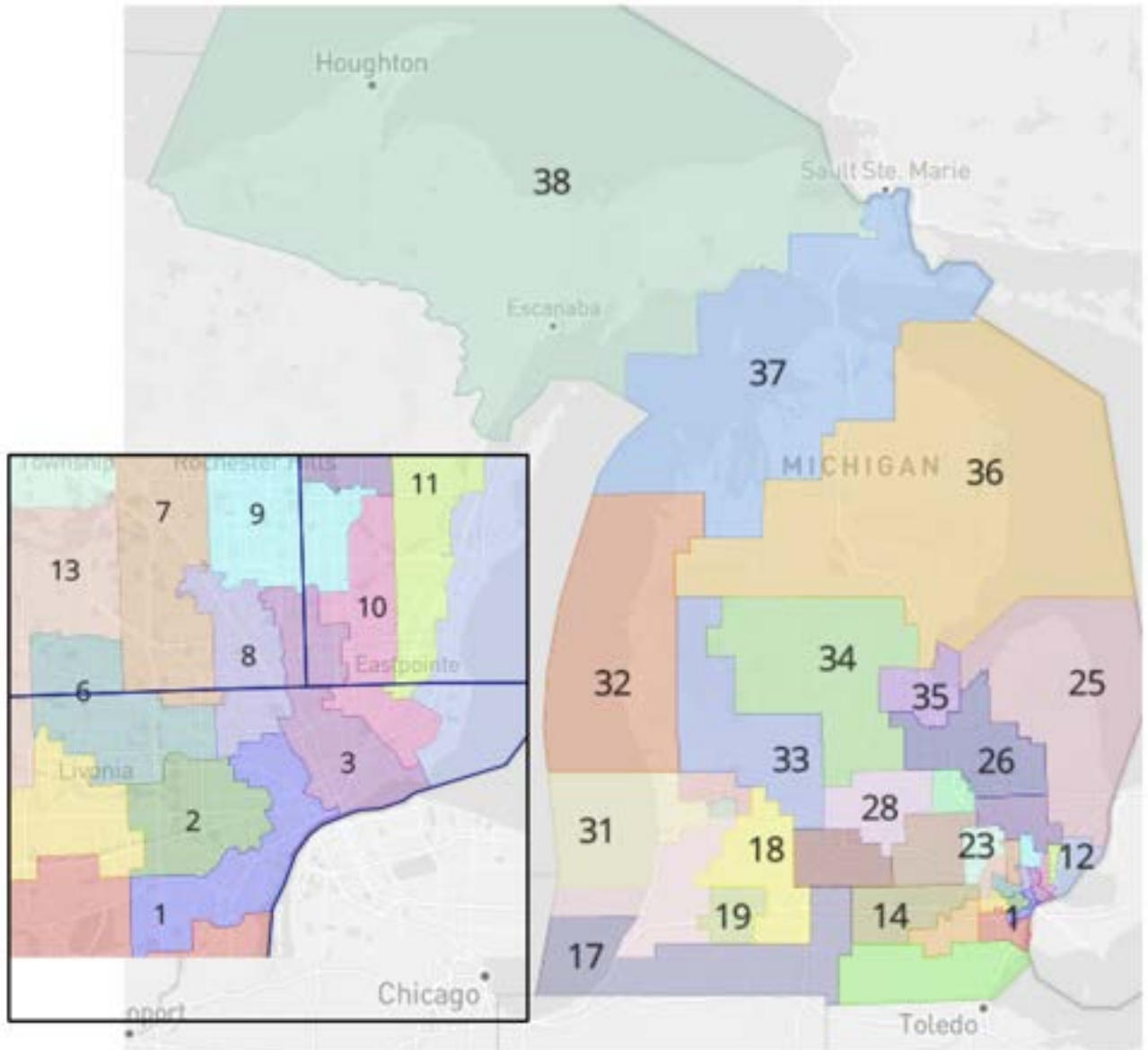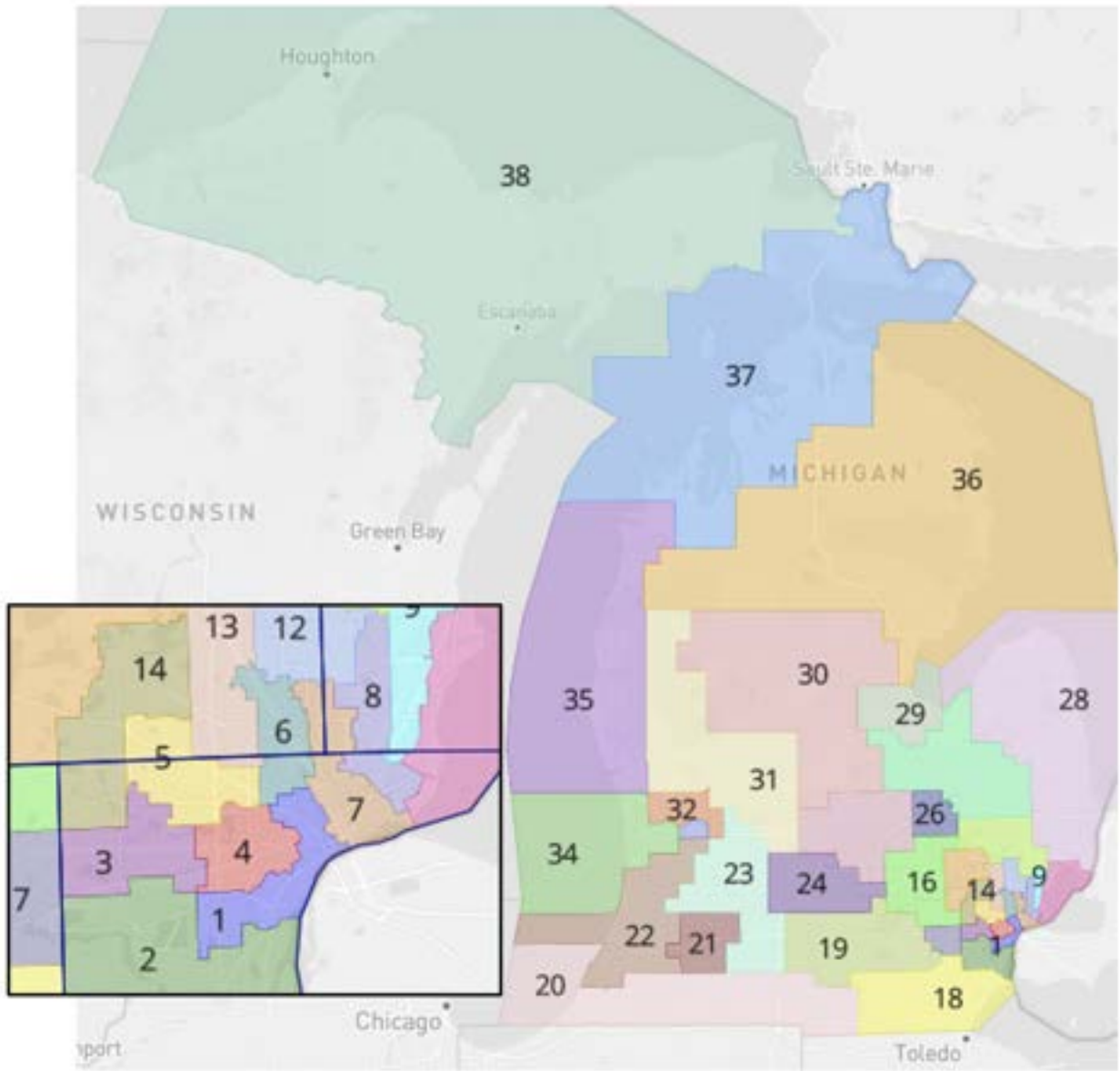

Plan Linden

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

-Plan Palm (map number #261). Voted 8-5 for publication. Opposed: Commissioners Eid (I), Kellom (D), Szetela (I), Valette (I), and Witges (D).

Plan Palm

VI.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.

With regard to population equality, we refer to the discussion under Section V.2.A.

With regard to the Voting Rights Act, we refer 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,

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

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 25. *Population Equality in Proposed Senate Plans*			
	Pop. difference	**Max. deviation**	**Partisan malapportion.**
Plan Cherry V2	4.91%	2.96%	–0.06%
Plan Linden	4.91%	2.96%	–0.13%
Plan Palm	5.00%	2.46%	–0.08%

These deviations are within the range that is acceptable for state legislative districts under the U.S. Constitution.

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 (with official map current numbers from IPUMS, not at the time of adoption). These numbers serve as proxy for the number of Black-minority districts of opportunity.

TABLE 26. *Black Minority Districts of Opportunity in State Senate Proposed Maps*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Cherry V2	0	4	5
Plan Linden	0	4	5
Plan Palm	0	4	5
2011 Official map	1	5	5
Proportional to Pop.		5	

As in the case of the congressional maps, the most striking result is that no majority-minority district 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 lower Black VAP share 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 unusual maps such that only 2.5% of maps have shares above or below the range covered by the arms.
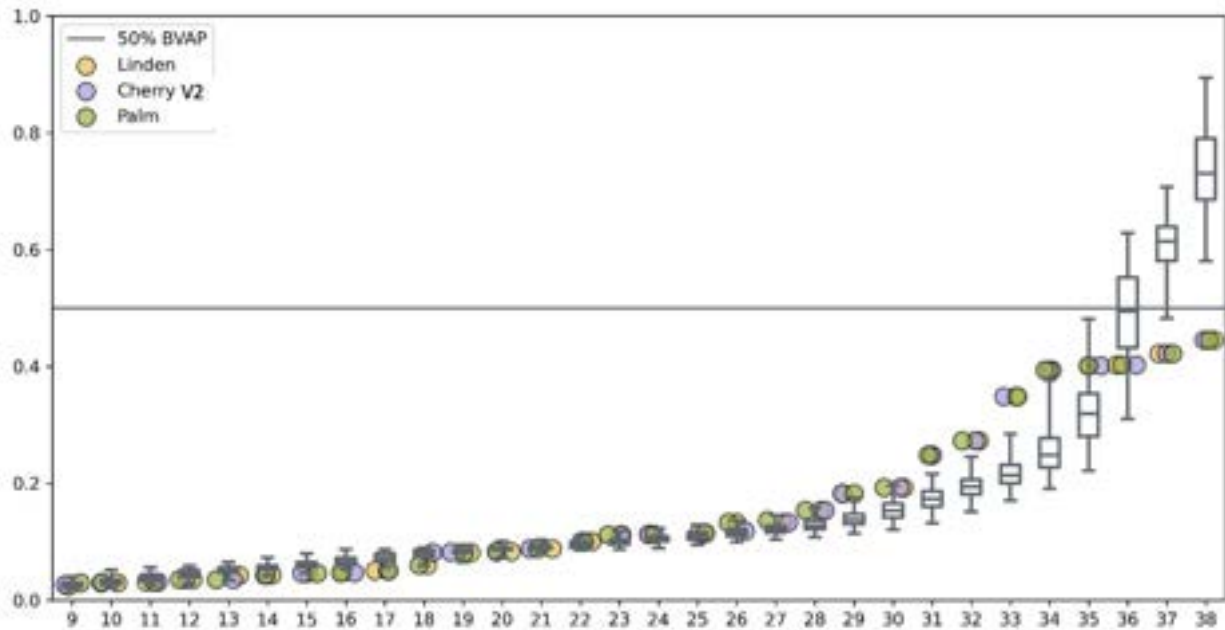

Figure 25. Distribution of Black VAP by Senate District

As we can see, these three Senate plans are unusual in engineering maps without a single majority-Black district. Almost all Senate maps in the Computer Ensemble feature two majority-Black districts; and 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 three of these plans generate five such districts with a large Black minority.

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.

This strategy toward compliance with the VRA is inherited from Draft Plan Cherry, and it received ample criticism during the second round of public hearings earlier this fall from Black community members and elected representatives in the city of Detroit. Our initial report released on Oct. 18,

2021, and its sentiment echoed by Voters Not Politicians, recommended that the Commission reassess this strategy. On Oct. 20, the Michigan Department of Civil Rights, through its director, declared that these districts "*violate federal civil rights law*" and "*dilute majority-minority districts and strip the ability for a minority voter to elect legislators who reflect their community.*"[52]

Subsequently, and at the intense urging of Detroiter commissioner Kellom, the Commission abandoned this strategy in its revision of its House plans that led to developing Proposed House Plan Magnolia. In the discussion associated with this revision of House plans, some commissioners questioned whether the VRA allows for majority-Black districts; this doubt could explain why the Commission would adhere to plans with no such districts. The Commission's VRA legal counsel resolved this doubt, explaining that districts with a Black majority drawn are allowed under the VRA if they are drawn to respect neighborhoods or communities, and not to concentrate minority voters in a district in order to reduce their influence in adjacent districts (i.e. "packing"). The revision of House plans thus proceeded apace, leading to the inclusion of several Black-majority districts in Proposed Plan Pine V5, Proposed Plan Hickory, and Proposed Plan Magnolia for the state House.

However, even after the Commission clarified that majority-minority districts constructed to reflect communities of interest are consistent with the VRA, the Commission did not conduct a revision of state Senate maps analogous to the one it conducted in the state House maps.

The racial composition of districts in Proposed plans Cherry V2, Linden and Palm are very similar to each other and to the results in the original Draft map Cherry from which all three are derived. Minor adjustments to better preserve some neighborhood boundaries in the city of Detroit lead only to small changes in the racial composition of districts.

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[52] Clara Hendrickson. "Redistricting commission told its draft maps violate federal Voting Rights Act." *Detroit Free Press, Oct. 20, 2021.*

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.
All three proposed Michigan Senate maps satisfy contiguity.

TABLE 27. *Contiguity in Proposed Michigan Senate Maps*	
	Are all districts contiguous?
Plan Cherry V2	Yes
Plan Linden	Yes
Plan Palm	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.

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

Results.
Each proposed map preserves 24 or 25 COI clusters, based on the 90 percent inclusion criteria (either the COI cluster is 90 percent within a district or a district is 90 percent within the COI cluster). In this case, most COIs are preserved by having districts within them because most are large. The results are similar to the computer-generated maps, which were not designed to preserve COIs but were designed to try to preserve counties. This does not show much Commission effort to preserve COI clusters, with little variation across plans.
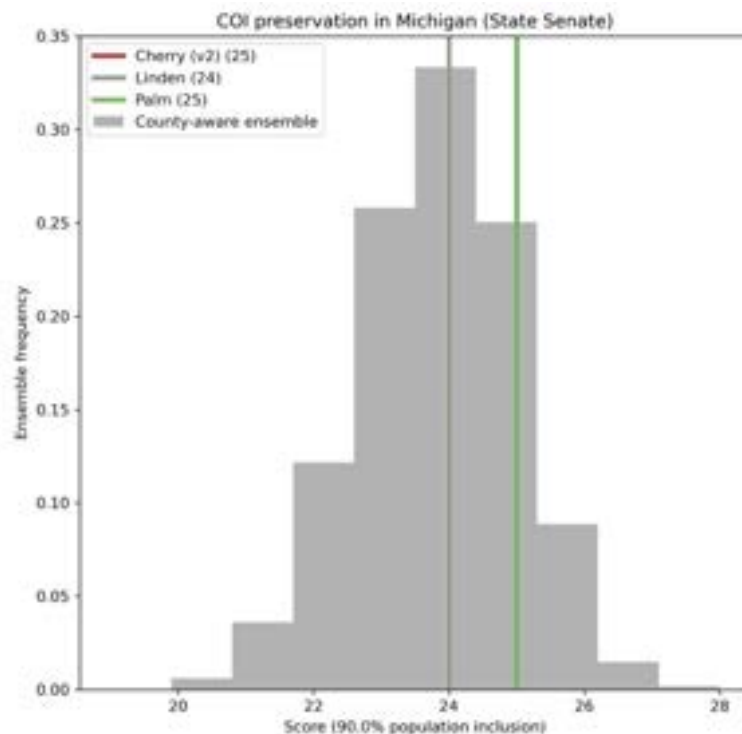

Figure 26. Community of Interest Preservation in State Senate Maps

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-D3 are exactly as described in Section III.2.D.

D4. **Median-Mean difference.**
Measure D4 is exactly as described in Section V.2.D on the Draft maps for state Senate districts.

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

D6. **Partisan Advantage.**
Exactly as described in Section V.2.D.

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 Proposed Senate maps in DRA 2020 under the names: "SD Cherry V2", "SD Linden" and "SD Palm". 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 U.S. Senate election as they 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). 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). For all these measures, we first compute results election by election, and second, calculate averages. The Princeton Gerrymandering Project uses the 2018 Michigan Governor, 2020 U.S. Senate and 2020 U.S. Presidential elections, first averaging them to construct an electoral composite in each precinct, and then using this composite to compute the results reported under the Outlier Test (D7).

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 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 votes. The "Outlier" (D7) indicates a party ("D" for Democratic or "R" for Republican) and a range of percentages. The letter indicates the party that this map favors, relative to the one million other maps in the Princeton Gerrymandering Project ensemble. The first number is the share of maps in the ensemble that are less favorable to this party (in the sense that the party would obtain fewer seats), and the second is the share of maps that are even more favorable (in the sense that the party would obtain more seats).

TABLE 28. *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 Cherry V2	+1.0 seat	+1.5%	−0.92 seats	+1.9%	+3.5%	−1.1 seats	D: 99.8% -0.0%
Plan Linden	+1.0 seat	+1.4%	−0.92 seats	+1.9%	+3.5%	−1.1 seats	D: 97% - 0.0%
Plan Palm	+2.0 seats	+4.2%	+0.08 seats	+3.1%	+4.9%	−0.1 seats	D: 85% - 3%

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 statewide elections (Presidential, U.S. Senate, Governor, Secretary of State, and State Attorney General) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 29. *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 Cherry V2	--	+3.4%	−0.3%	+1.2%	+4.6%	--	--
Plan Linden	--	+3.3%	−0.3%	+1.2%	+4.5%	--	--
Plan Palm	--	+6.2%	+2.3%	+3.2%	+5.7%	--	--

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 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, just about cancelling the effect of political geography.

Figure 27 illustrates that these plans are more favorable to Democratic candidates than many other maps. Compare Figure 27 to Section V.2D, which showed the same figure for the Draft. Under Proposed Plan Palm, Democratic candidates win one seat more than under the average map, which is within the normal range, not an outlier. But under Proposed Plan Cherry V2 or Plan Linden, they win two seats more than under the average map.
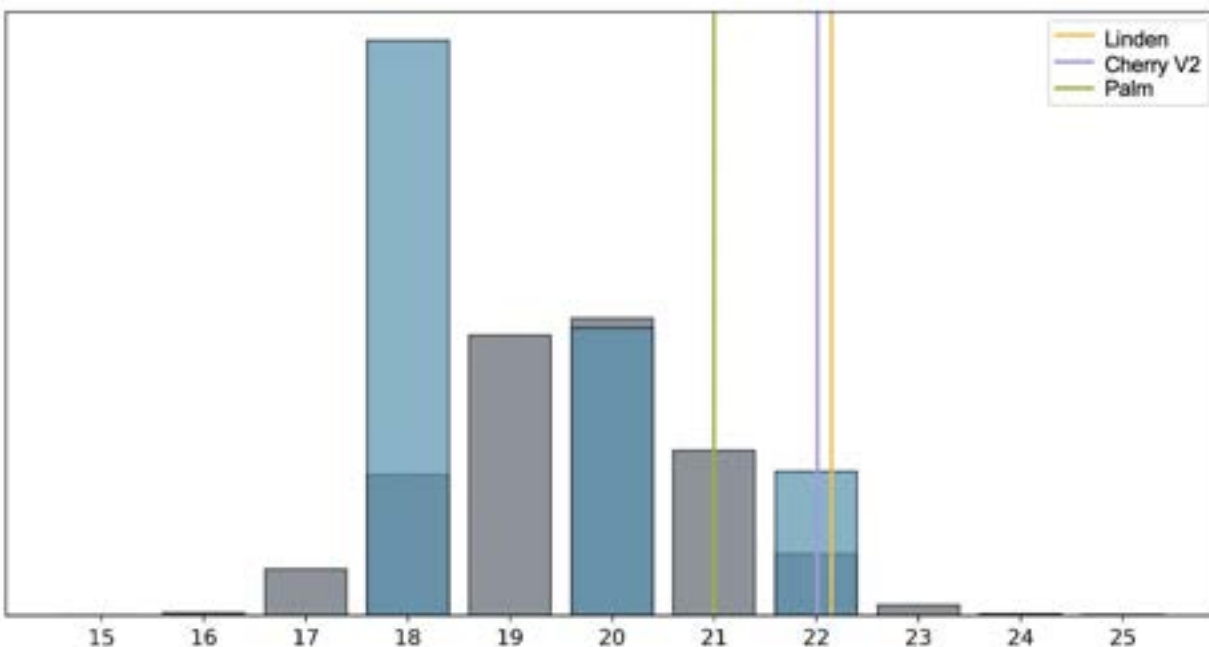

Figure 27. Number of Seats Democrats would Win with Senate 2018 Results

This is not a fluke from this particular election. Take instead the independent results with the Princeton computer ensemble (one million maps) and the Princeton election composite (the average of the 2020 Presidential, 2020 U.S. Senate in Michigan, and 2018 Governor elections).
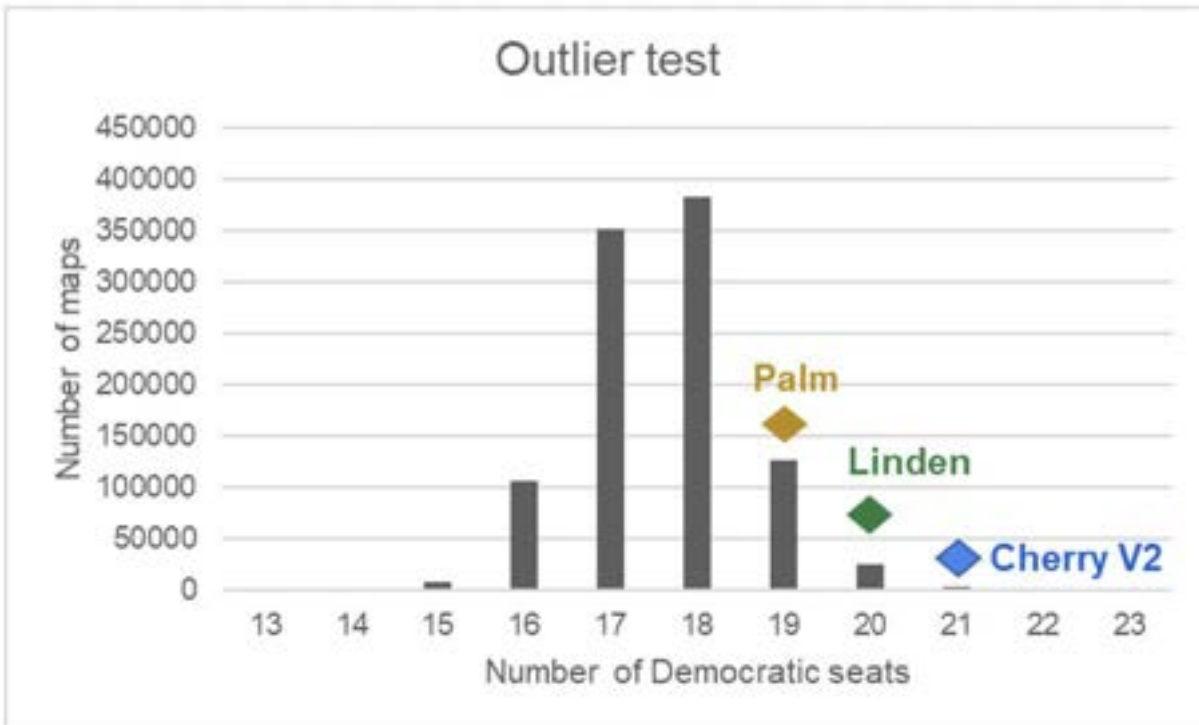
Figure 18. Democratic Seats with Princeton Composite Election Results.

Once again, Proposed Plan Palm appears within range of computer-generated maps, but Proposed Plan Linden and Proposed Plan Cherry V2 become outliers that give more seats to Democrats than almost any other map. It is easy to see why: Proposed Plans Cherry V2 and Linden split a potential Democratic district in Ann Arbor into two urban-rural districts for a partisan gain of one seat to Democrats. Proposed Cherry V2 creates two, four-county districts heading west from the city. Linden creates two, more compact two-county districts.

Proposed Plan Cherry V2 and Proposed Plan Linden's appearance may make them susceptible to legal claims on grounds of inadmissible partisan intent and partisan outcome. We do not venture a prediction as to how courts would view such claims, since under other measures of partisan fairness neither Proposed Plan Cherry V2 nor Proposed Plan Linden favor Democrats enough. If courts consider measures of symmetry, concerns about neutrality could be mitigated. In prior cases, criticized maps often scored poorly on both symmetry and neutrality, meaning they did not raise the trade-off between an intent to improve symmetry by drawing maps that would be unlikely to be drawn without partisan intent. We note that the Michigan Constitution states that the advantage to a political party shall be determined using "*accepted measures of partisan fairness*," and under one such measure -- the outlier test -- that Courts have deemed acceptable, these maps are more favorable to Democrats.

We also note that it is possible to draw maps (such as Plan Spruce and Plan Elm among the Draft plans) that fall within the normal range in all measures. Such maps could favor Democrats in some measures, and Republicans by other measures, but always in small to moderate amounts. Proposed Plan Cherry V2 and Plan Linden instead move toward symmetry at the cost of neutrality.

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.
We refer to the discussion under Section V.2.E on the analysis of the Draft state Senate maps.

Results.

We present first results on double-bunking, i.e. assigning two incumbents to the same district. We report two numbers. The first considers all incumbents and uses addresses from the 2020 Michigan Candidate Listing file made public by the MI Secretary of State. With this data, the typical range in the computational ensemble is from 5 to 9, and in the public ensemble, from 6 to 9, so these three maps all fall within these ranges.

TABLE 30. Districts with Two Incumbents in Proposed State Senate Plans	
Plan Cherry V2	7 [4]
Plan Linden	6 [4]
Plan Palm	6 [4]

However, many incumbents are term-limited, and cannot run again, so placing them in the same district with another incumbent is irrelevant. The second number, in brackets, considers only incumbents who are not term-limited, and uses addresses obtained from the Michigan Voter file by Mike Wilkinson for Bridge Michigan.[53]

On competitiveness, if we define a "competitive district" as one that each of the two parties won in at least one of the five elections in the MGGG data set (namely, the 2018 Senate, Governor, Secretary of State, and Attorney General elections, and the 2016 Presidential election), then all three Proposed Senate plans feature five such districts, close to the middle of the range of the computational ensemble (among those maps, most feature between three and nine competitive districts, with the most frequent result being six).

Proposed Plans Cherry V2 and Linden feature 23 election results decided by a less than 6% margin, from among 190 total election results (five elections in each of 38 districts). Proposed Plan Palm features 26 competitive districts, more in line with what is typical of maps in the Computational Ensemble.

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[53] Sergio Martinez-Beltrán and Mike Wilkinson, "Redistricting may oust half of incumbents in Michigan, analysis finds", November 23, 2021, Bridge Michigan.
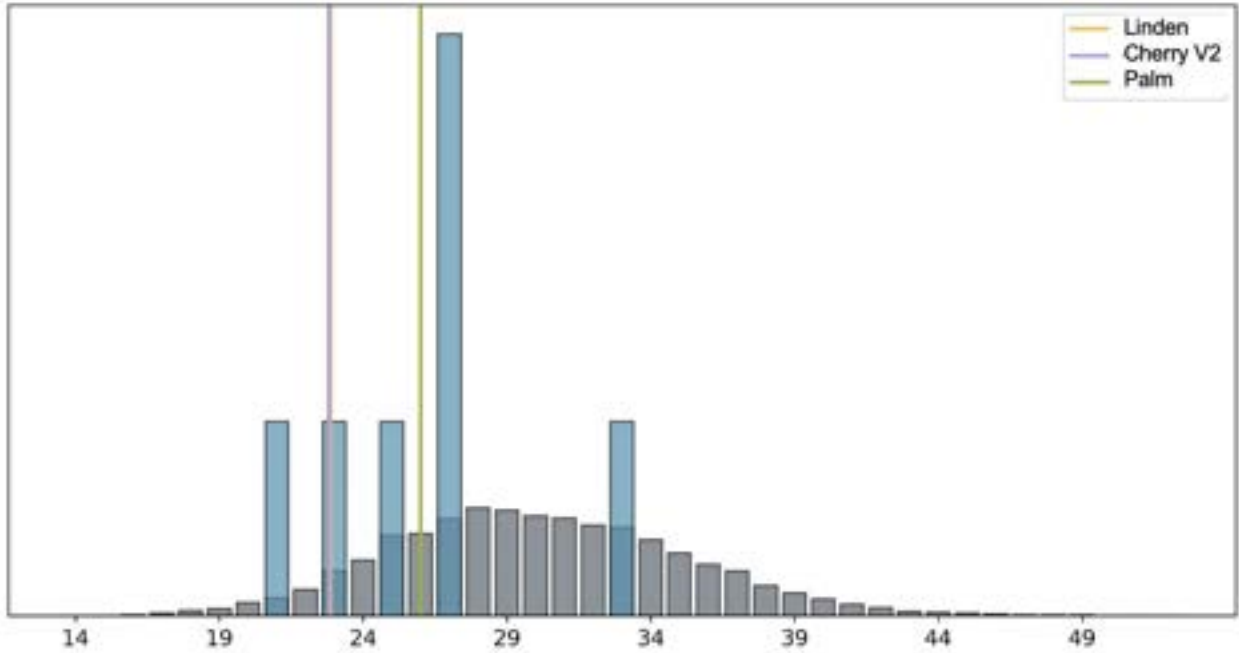
Figure 29. Number of Elections within 6% Margin, Senate Maps

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 first present the results in table format.

TABLE 31. Split Jurisdictions and Jurisdictional Splits in Proposed State Senate Maps.				
	Split Counties	County Pieces	Split Municipalities	Municipality Pieces
Plan Cherry V2	28	92	65	154
Plan Linden	31	95	61	146
Plan Palm	27	90	59	142

Proposed Plan Palm features fewer splits than Proposed Plan Cherry V2 or Proposed Plan Linden. All three plans are variations on the original Draft Plan Cherry, but Proposed Plan Palm keeps Ann Arbor whole. The original Proposed Plan Cherry splits 25 counties. Proposed Plan Cherry V2 and Proposed Plan Linden split Ann Arbor into two cross-county districts.
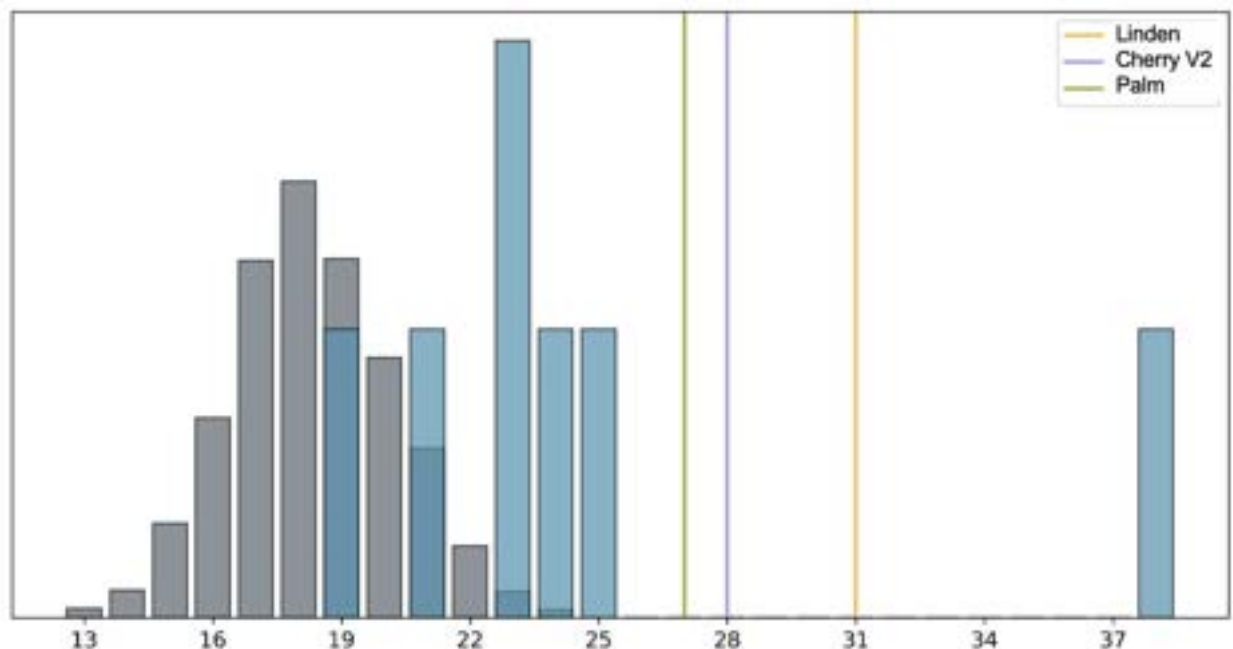

Figure 30. Split Counties in Proposed Senate Maps

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 32. Compactness Measures in Proposed Senate District Plans			
	Polsby-Popper	Reock	Cut Edges (fewer is better)
Plan Cherry V2	0.40	0.38	1368
Plan Linden	0.40	0.39	1353
Plan Palm	0.41	0.40	1319
2011 Official Map	0.39	0.40	n.a.

All three of these plans are reasonably compact. Plan Palm is more so.
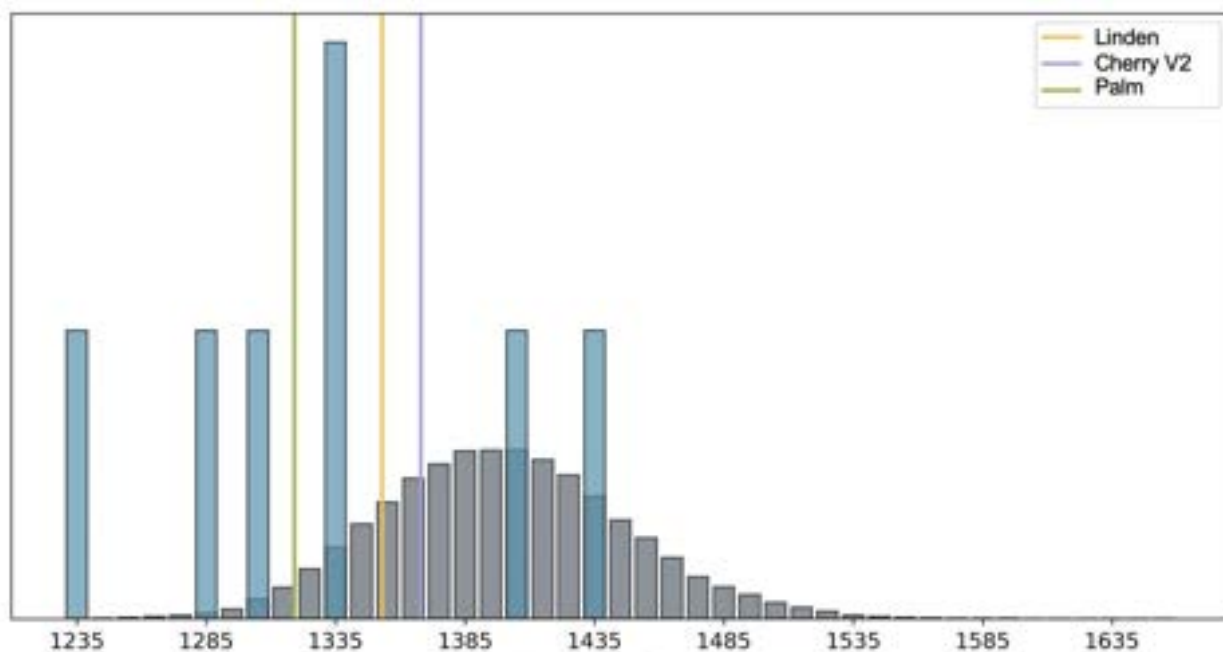

Figure 31. Number of Cut Edges in Proposed Senate District Plans

VI.3. SUMMARY OF RESULTS

Proposed Plan Cherry V2, Plan Linden, and Plan Palm are all complete redistricting plans that divide the entire state into 38 contiguous districts. All three stem from the Draft Plan Cherry, offering three different configurations for the City of Ann Arbor and its surrounding area: Plan Palm would keep the City of Ann Arbor whole in a district; while Plan Linden would split it into two two-county urban-rural districts, and Plan Cherry V2 would split it into two, four-county East-West rural-urban strips, with adjustments reverberating into nearby districts and counties. They are otherwise very similar to each other, and to their common predecessor Draft Plan Cherry, with many district boundaries common to all four plans.

All three of these plans feature large deviations from population equality, between 4.9% and 5%, or between 12,600 and 13,000 inhabitants.

All three follow the same strategy toward compliance with the VRA, inherited from Draft Plan Cherry: they feature four districts with more than 40% of their Voting Age Population identifying as "Black," and five with more than 35%. None feature a district with more than 45% of its Voting Age Population identifying as "Black" (the previous plan featured two). This absence of more than 45% Black districts is the most striking feature within these Proposed maps. It is achieved by breaking apart the large concentration of Black voters in the city of Detroit and reconfiguring them in thin North-South strip districts (numbered 3, 10, 11 and 12 in Proposed Cherry V2 and Proposed Linden; and numbered 7, 8, 9 and 10 in Proposed Palm) that radiate northbound beyond the city limits and across county boundaries into suburban and less Black Macomb and Oakland counties.

It is not readily apparent how the districts in these plans — specially the cross-county North-South strip districts 5, 6, 7 and 8 — reflect Communities of Interest in the state of Michigan.

All three of these plans perform well on most measures of partisan fairness, but Proposed Plan Cherry V2 and Proposed Plan Linden are outliers on tests of neutrality: they create more Democratic districts than almost every computationally generated map created without partisan considerations. Plan Palm performs well on all partisan fairness measures, though it is more favorable toward Republicans on tests of symmetry. Plans Cherry V2 and Linden thus create maps more favorable to Democrats and closer to symmetry than maps drawn without partisan considerations, while Plan Palm preserves a bit more of the Republican geographic advantage.

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

Proposed Plan Palm reflects county, city and township boundaries better than Proposed Plan Cherry V2 or Proposed Plan Linden. All three plans are reasonably compact; Proposed Plan Palm more so.

These three plans are very similar. They offer different solutions for the city of Ann Arbor and the surrounding areas stretching into neighboring counties, but they are three variations of the same general plan, rather than three truly distinct plans. Proposed Plan Palm performs better on lower-ranked criteria.

Again, we stress a concern that applies to all three of these plans. The city of Detroit contains more than half a million inhabitants who identify as "Black." Under any map that keeps this urban community as a whole or regions of the city with more Black residents together, Blacks would

constitute a majority in at least two and probably in three Michigan Senate districts. Proposed Plan Cherry V2, Proposed Plan Linden and Proposed Plan Palm slice this community in order to create urban-suburban cross-county districts, diluting the Black urban vote in such a way that Black voters do not constitute more than 45% of voters in any district. The intent appears to be to create more total districts of opportunity for Black voters, but it is unconventional.

We lack sufficient data to know that districts in and around Detroit with 40%-42% of Black Voting Age Population will allow the Black minority population to elect its candidates of choice in both primaries and general elections. If it cannot elect its candidate of choice, then these three plans do not comply with the Voting Rights Act. Members of the public, elected representatives, and the Michigan Department of Civil Rights expressed this concern during the second round of public hearings prior to the drawing of the current Proposed maps.

Thereafter, the Commission revamped state House District maps in its latest iteration of Proposed maps scheduled for another round of public comment. State Senate District maps, however, appear little changed and again be subject to question.

We understand that many candidates preferred by Black voters elsewhere in the United States are able to be elected in districts with minority Black populations. If that is true of these districts, the proposed maps would likely increase Black representation in the State Senate. But perceptions of opportunity also matter for its realization. If African-American candidates and other candidates preferred by Black voters do not perceive these districts as favorable, that could reduce the chance they compete in primary elections, reducing Black representation.

We continue to recommend that *the MICRC reevaluate its approach toward compliance with the Voting Rights Act.* And that the Commission give due consideration to draw state Senate District maps demonstrating more robust districts of opportunity for the Black community in the city of Detroit, especially if they better reflect communities of interest. We find Proposed Plan Cherry V2, Proposed Plan Linden and Proposed Plan Palm share the problems we identified in the Draft maps. These maps could fail to adequately represent the communities of interest of the citizens of Detroit or its surrounding areas, based on their neighborhoods.

Since these considerations reflect concerns about the performance of these maps on constitutional Criteria A, population balance and Voting Rights Act, and Criteria C, population diversity and Communities of Interest, these concerns dominate consideration of other criteria.

Because none of these collaboratively proposed Michigan Senate plans showed responsiveness to our recommendations (unlike some state House maps), we look to plans submitted by individual commissioners that create plans with different approaches toward compliance with the Voting Rights Act that are less open to criticism or question. We present a plan with at least two districts with a Black Voting Age Population of at least 45 percent and with three districts with a Black Voting Age Population of at least 43% in the following Appendix.

VI. APPENDIX. PROPOSED SENATE PLANS SUBMITTED BY INDIVIDUAL COMMISSIONERS.

There are three individual commissioner submissions for state Senate District plans:

- Proposed Szetela Senate District Map Number #268, submitted by Commissioner Rebecca Szetela, Independent, of Canton.
- Proposed Kellom Senate District Map, Number #270, submitted by Commissioner Brittni Kellom, Democrat of Detroit
- Proposed Senate District Map Lange, Number #274, submitted by Rhonda Lange, Republican of Reed City.

Proposed Senate District Map Szetela and Proposed Senate District Map Lange follow the same strategy toward compliance with the Voting Rights Act as Proposed Cherry V2, Plan Linden and Plan Palm. Districts are arranged in a similar manner. We do not analyze these plans further.

Proposed Senate District Map Kellom, on the other hand, presents a distinct alternative, and a very different configuration of the region including Detroit, with three Black-majority districts, similar to race-blind maps in the Computational Ensemble. We thus analyze SD Kellom further, appending some its scores to those of the Proposed plans.

TABLE 25 Appendix. *Population Equality in Proposed Senate Plans and SD Kellom*			
	Population difference	**Maximum. Deviation**	**Partisan malapportionment**
Plan Cherry V2	4.91%	2.96%	–0.06%
Plan Linden	4.91%	2.96%	–0.13%
Plan Palm	5.00%	2.46%	–0.08%
Plan SD Kellom	4.27%	2.27%	n.a.

Plan SD Kellom slightly outperforms all three Proposed plans on population equality. Table 26 Appendix returns to the number of potential districts of opportunity for the Black minority in Table 26, but from a different source (DRA 2020), and a different categorization. Where Table 26 defined "Black" as "Black or African-American only" in the U.S. Census, the DRA 2020 results feeding into Table 26 Appendix categorize as "Black" any individual who identifies as "Black," possibly as one of multiple racial identifications.

TABLE 26 Appendix. *Districts of Opportunity in Proposed Senate Plans and SD Kellom*			
	# > 50% VAP Black	**# >40% VAP Black**	**# >35% VAP Black**
Plan Cherry V2	0	5	6
Plan Linden	0	5	6
Plan Palm	0	5	6
Plan SD Kellom	3	4	5
2011 Official map	2	5	6
Proportional to Population	5		

We find that SD Kellom outperform alternative maps in the number of districts of opportunity. When multiple Black racial identities are taken into consideration, the Proposed Kellom map's four Black 40% Black VAP districts actually measure in excess of 45% Black VAP. Only one in

five of all other Proposed maps assessed measures at more than 45% VAP Black. Proposed SD Kellom map also satisfies contiguity requirements.

TABLE 28 Appendix. *Partisan Fairness in Proposed Senate Plans and SD Kellom*				
	Efficiency Gap	Proportionality	Median-mean	Partisan Advantage
	D2	D3	D4	D6
Plan Cherry V2	+3.4%	+1.1 seats	+1.2%	−1.1 seats
Plan Linden	+3.3%	+1.1 seats	+1.2%	−1.1 seats
Plan Palm	+6.2%	+2.3 seats	+3.2%	−0.1 seats
Plan SD Kellom	+3.2%	+1.4 seats	+2.1%	−0.8 seats

On Partisan Fairness measures, SD Kellom looks similar to Proposed Plan Linden or Proposed Plan Cherry V2, but we await an analysis of its outlier status.

TABLE 31 Appendix. Split Counties and County Splits in Proposed State Senate Maps.		
	Split Counties	County Pieces
Plan Cherry V2	28	92
Plan Linden	31	95
Plan Palm	27	90
Plan SD Kellom	30	87

Plan SD Kellom performs about as well on respecting boundaries and on compactness as other Proposed Senate District maps.

TABLE 32. Compactness Measures in Proposed Senate District Plans and Proposed SD Kellom		
	Polsby-Popper	Reock
Plan Cherry V2	0.40	0.38
Plan Linden	0.40	0.39
Plan Palm	0.41	0.40
Plan SD Kellom	0.40	0.39
2011 Official Map	0.39	0.40

The results on Tables 25 Appendix, 26 Appendix and 31 Appendix are from DRA 2020, using the 2020 U.S. Census population data. On Table 28 Appendix, the measures for the Efficiency Gap and the Median-Mean difference are from the MICRC Compliance Sheet, using all 10 statewide elections from 2012 to 2020; and the deviation from proportionality and the Partisan Advantage are computed by Dr. Christian Cox of Yale University and based upon 2016 and 2020 presidential elections and the 2014 and 2018 elections to the Michigan Senate. Deviations from proportionality or from the neutral jurisdictional benchmark in the partisan advantage are measured in seats; whereas, the Efficiency Gap and the Median-Mean measure differences in shares of votes.

SD Kellom outperforms all three Proposed Plans for state Senate districts (Plan Cherry V2, Plan Palm and Plan Linden) on both aspects of Criterion A.

We note that SD Kellom may also appear as a partisan outlier, giving more seats to Democrats than computer-generated maps, and perhaps one additional seat than Proposed Plan Palm. Proposed Plan SD Kellom follows the Proposed Plan Linden split for the Ann Arbor area, resulting in partisan scores similar to those of Proposed Plan Linden.

Yet we advise consideration of SD Kellom because it creates an alternative path toward compliance on the top-ranked Criterion A, which could outweigh any loss on partisan fairness measures based on neutrality compared to Plan Palm. As with plans Cherry V2 and Linden, plan SD Kellom sacrifices neutrality to achieve slightly more symmetry.

PART VII. ANALYSIS OF DRAFT MAPS FOR MICHIGAN'S STATE HOUSE DISTRICTS

VII.1. THE DRAFT MICHIGAN HOUSE DISTRICT MAPS

The MICRC approved the following Draft maps for Michigan House of Representatives districts, for consideration in the second round of public hearings (Oct 20 – Oct 27, 2021): [54]

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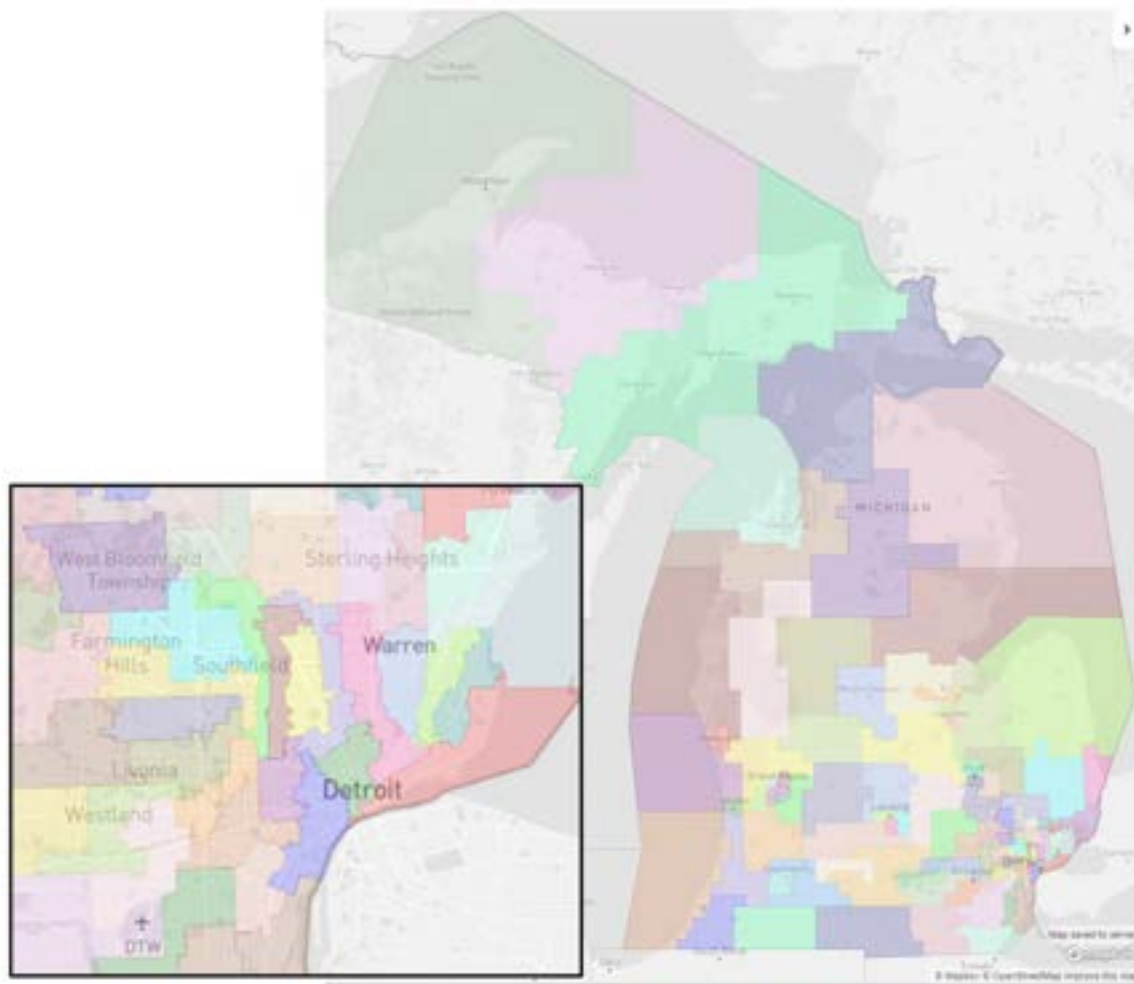

Plan Pine

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[54] 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.
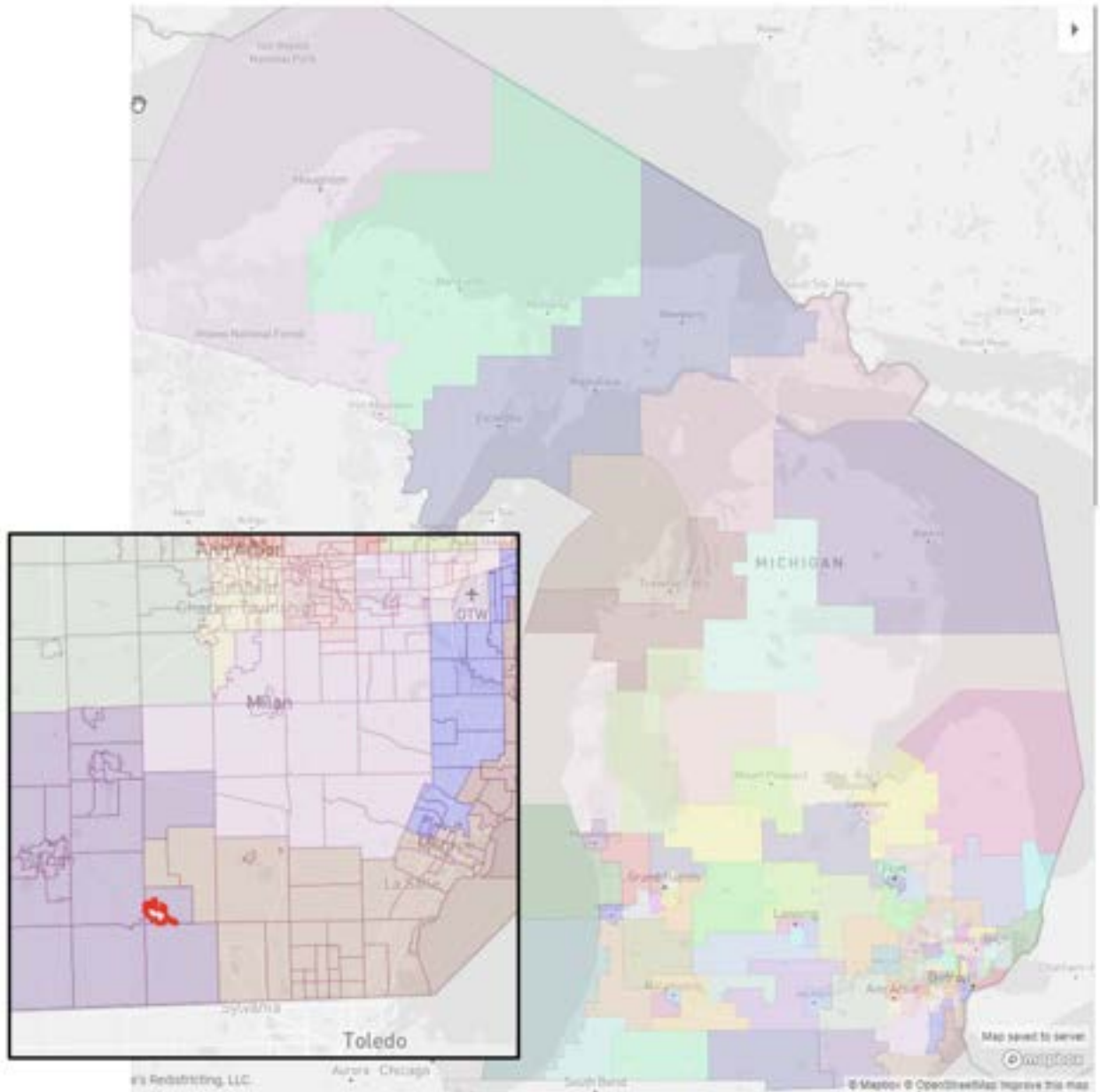
Plan Peach (incomplete)

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

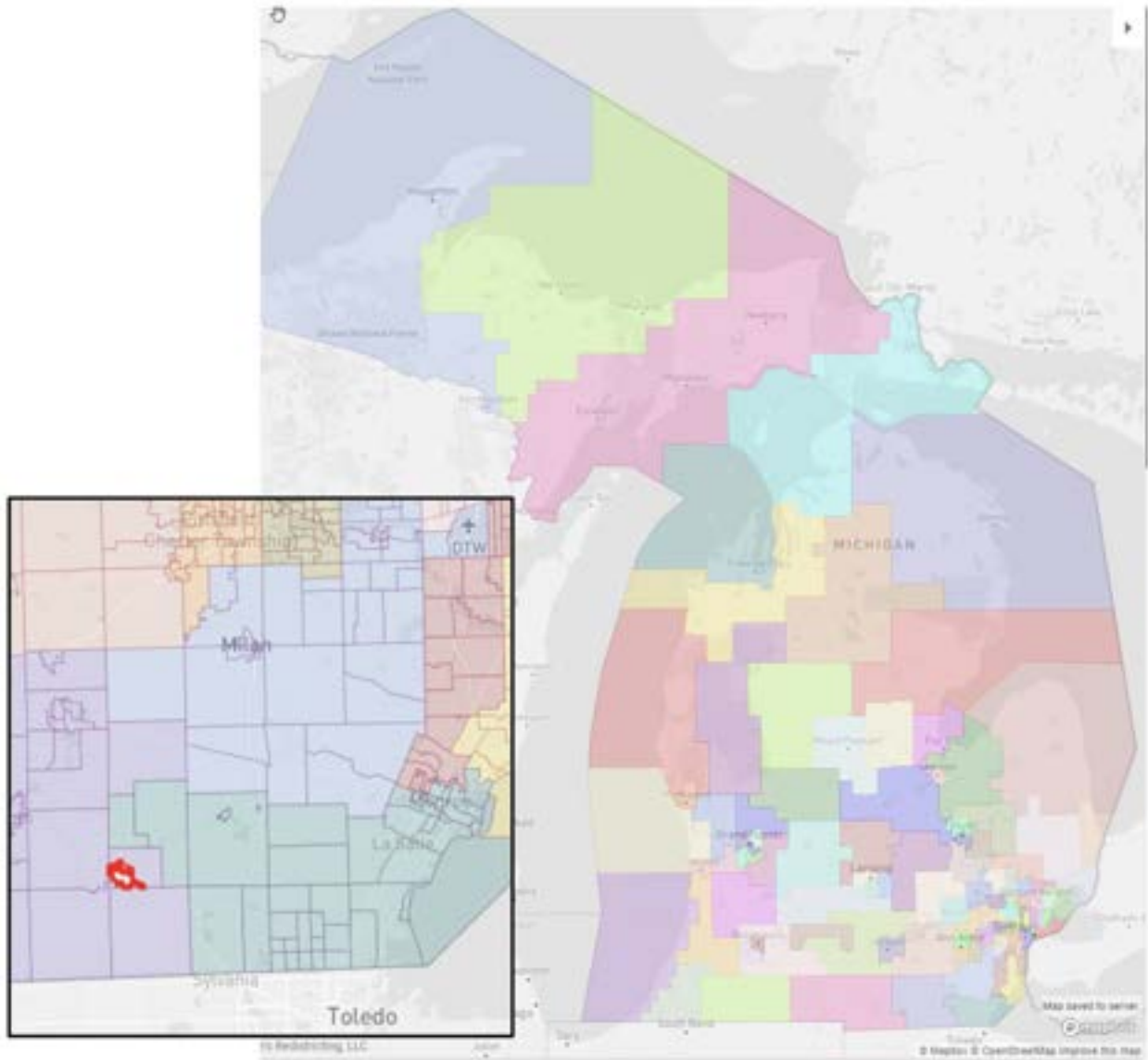Note that the Oak map does not appear to be a valid redistricting plan, as it fails to assign a district to all the areas of Michigan. Plan Oak fails to assign any district to a precinct with population 3,204 in the village of Blissfield (Lenawee County). This area —highlighted in red on the inset map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

Plan Oak (incomplete)

VII.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.[55] 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."[56] 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.[57]

If there is any substantial deviation from population equality, supporters of one party cannot be systematically placed in larger districts.[58]

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 of districts won by Republican Party candidates, in all U.S. Presidential or Michigan Senate

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[55] Reynolds v. Sims, 377 US 579-580.
[56] Brown v. Thomson, 462 US 842.
[57] Brown v. Thomson, 462 US 835.
[58] *Cox v. Larios*, 542 U.S. 947

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 33. *Population Equality in House Plans*			
	Population difference	**Maximum 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 (except official map numbers again from IPUMS). These numbers serve as proxy for the number of Black-minority districts of opportunity.

TABLE 34. *Black Minority Districts of Opportunity in State House Draft 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	12
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 unusual maps such that only 2.5% of maps have shares above or below the range covered by the arms.
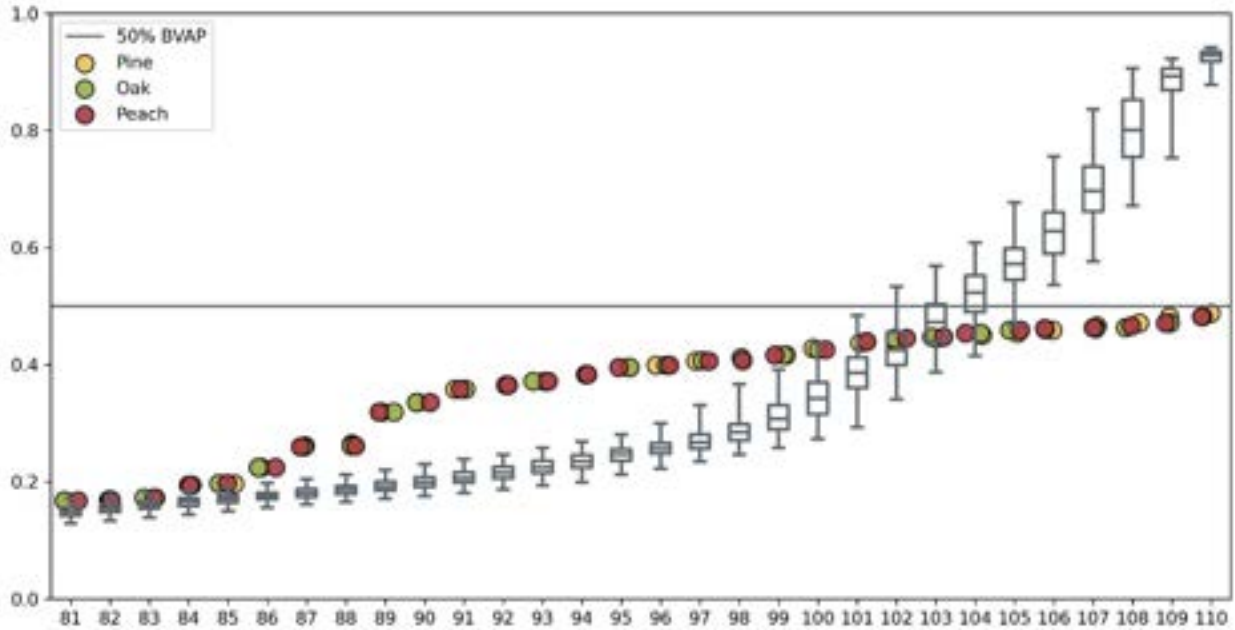
Figure 32. Distribution of Black VAP by House District

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 degree, 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.
None of these plans satisfies contiguity.

TABLE 35. *Contiguity in Draft State House plans*	
	Are all districts contiguous?
Plan Pine	No
Plan Peach	No
Plan Oak	No

Each of these maps feature districts that violate contiguity by having small geographic areas isolated from the rest of the district. For instance, in all three maps, census block 2005 in census tract 4211 in Washtenaw County is in District 61, even though all the census blocks surrounding it are in District 65.

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.

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

Results.
Each of the proposed maps preserves 31 COIs by the 90 percent inclusion criteria, mostly by having districts within larger COIs rather than COIs within districts. That is slightly below what would be expected from chance.
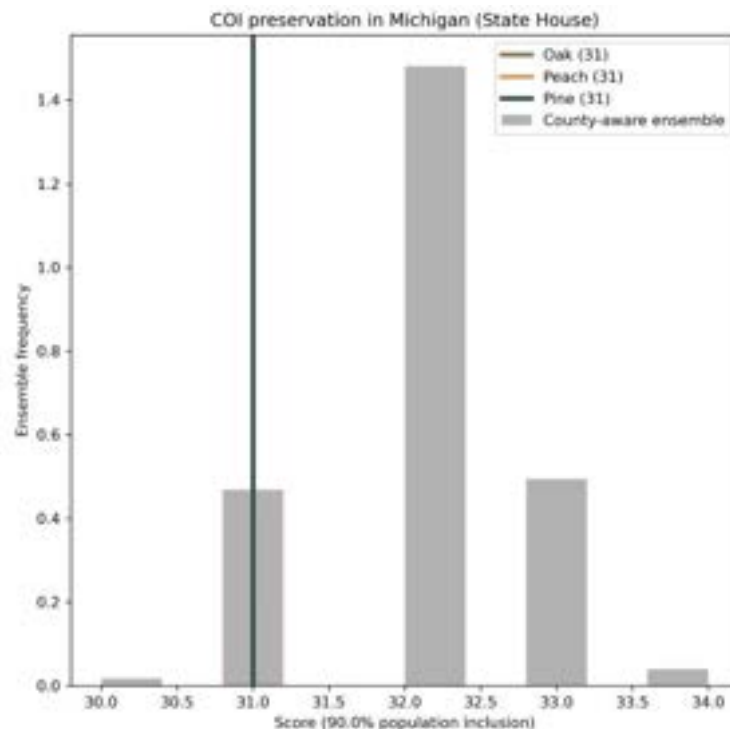

Figure 33. Community of Interest Preservation in State House Maps

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.**
We refer to the discussion under Section VII.2.D on the analysis of the Draft state House maps.

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

D6. **Partisan Advantage.**
We refer to the discussion under Section VII.2.D on the analysis of the Draft state House maps.

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 V.2.D8 on the analysis of Draft district plans for the state Senate.

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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 U.S. 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). The 2014, 2016, 2018, and 2020 US 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). For all these measures, we compute results election by election, and then we average. The Princeton Gerrymandering Project uses the 2018 Michigan Governor, 2020 U.S. Senate and 2020 U.S. Presidential election, first averaging them to construct an electoral composite in each precinct, and then using this composite to compute the results reported under the Outlier Test (D7).

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 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 votes. The "Outlier" (D7) indicates a party ("D" for Democratic or "R" for Republican) and a range of percentages. The letter indicates the party that this map favors, relative to the one million other maps in the Princeton Gerrymandering Project ensemble. The first number is the share of maps in the ensemble that are less favorable to this party (in the sense that the party would obtain fewer seats), and the second is the share of maps that are even more favorable (in the sense that the party would obtain more seats).

TABLE 36. *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	D: 99.9%-0%
Plan Peach [*]	*+10.9%*	*+6.4%*	*+3.3 seats*	*+4.1%*	*+5.8%*	*-0.9 seats*	D: 99.3%-0%
Plan Oak [*]	*+10.9%*	*+6.6%*	*+3.5 seats*	*+4.2%*	*+5.9%*	*-0.8 seats*	D: 97%-1%

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 37. *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 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 help Democratic candidates a little bit (by about one seat), but, as reflected by measures D1 through D5, this is help is 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 34. 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. On the other hand, according to the computational ensemble and the composite election used by the Princeton Gerrymandering Project, the maps are outliers that favor the Democratic Party, especially Plan Pine and Plan Peach: under most plans Democrats would obtain between 50 and 55 seats, but under Plan Oak they would obtain 56, under Plan Peach 57, and under Plan Pine 58.

However, these plans, while outliers relative to that ensemble under that particular composite election results, are tilting the outcome in the direction that is more symmetric for the two main parties, so the fairness of the plans depends on the preferred notion of fairness.
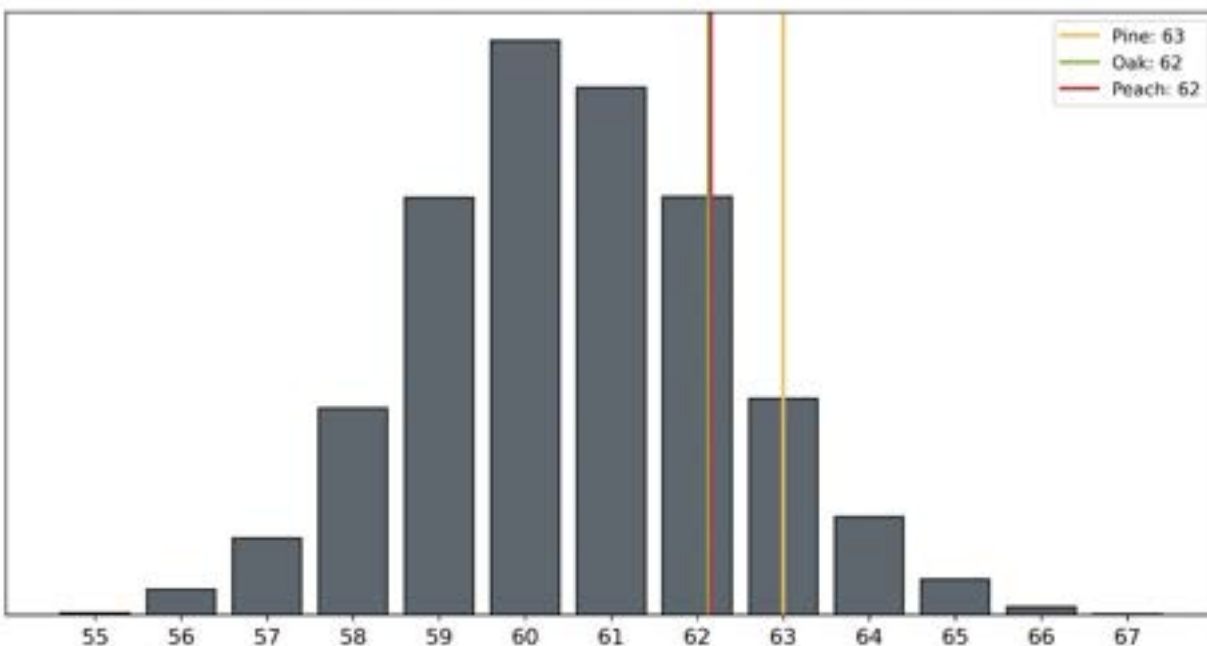

Figure 34. Number of Seats Democrats Would Win with 2018 SoS Results

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 available in the histogram below. The computer-generated maps double-bunk incumbents far more than the Tree maps do. Pine and Peach each double-bunk 19 incumbents while Oak double-bunks 20.
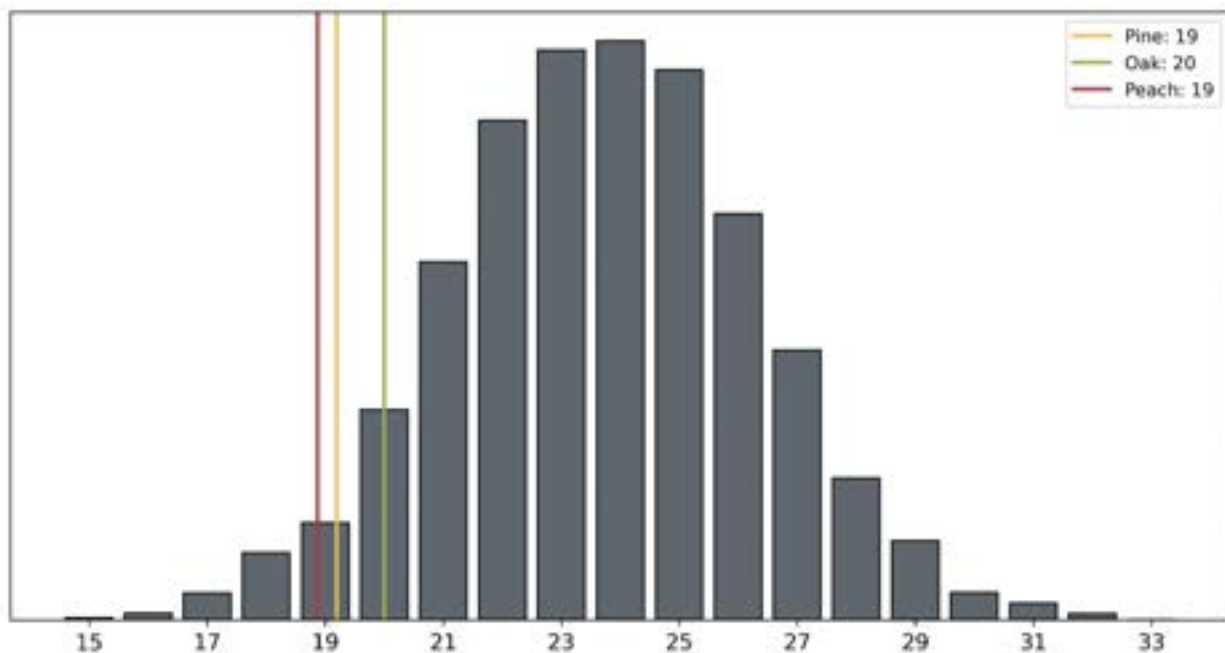

Figure 35. Double Bunked Incumbents in State House Maps

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.
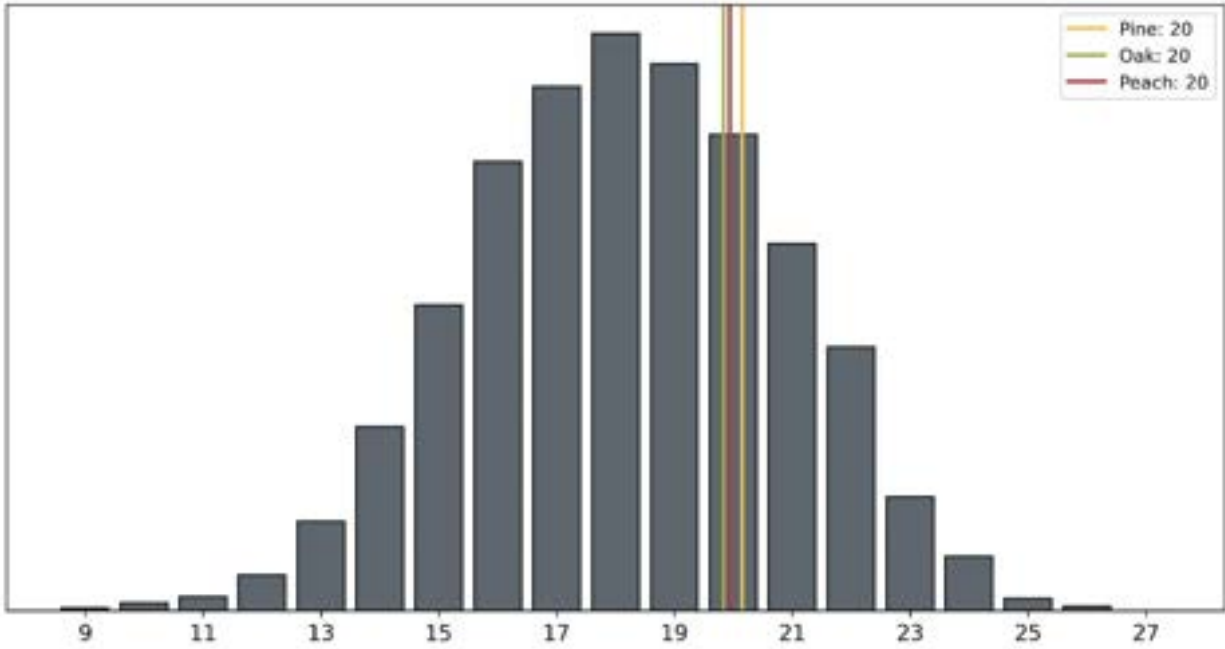
Figure 36. Number of Swing State House Districts

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.

TABLE 38. Split counties, and county splits in Draft House 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.

The computer-generated maps split municipalities far more than the Tree maps. Oak splits 117 municipalities, Peach splits 124, and Pine splits the most at 130.
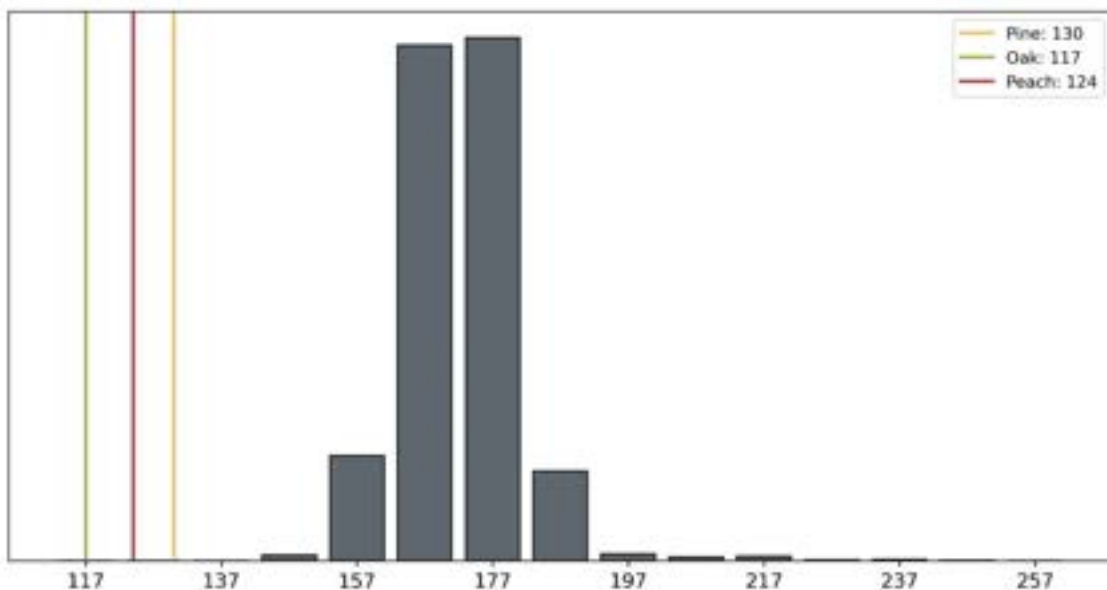

Figure 37. Split Municipalities in State House Districts

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 39. Compactness Measures in Draft State 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 high (bad) end of the distribution of the Computational Ensemble.
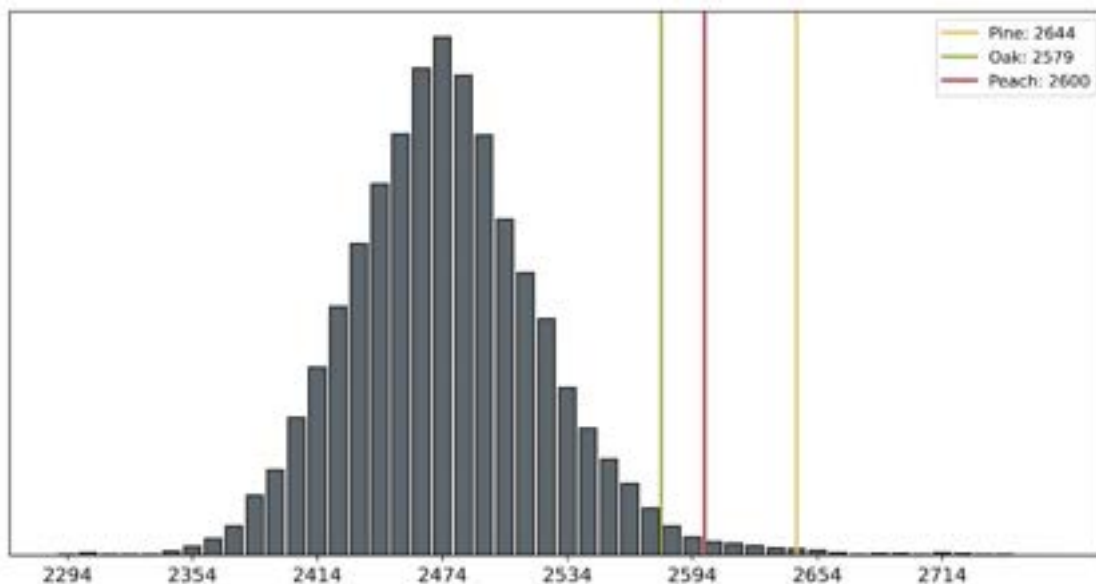

Figure 38. Number of Cut Edges in House District Draft Plans

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 non-compact result illustrated by Figure 38, which dovetails with the high number of county splits.

VII.3. SUMMARY OF RESULTS

Plan 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 state 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-shaped districts — reflect Communities of Interest in the state of Michigan. We cannot say that they fully reflect the collection of Communities of Interest submitted by citizens.

The maps' performance on partisan fairness varies more across measures of fairness, than across maps. All three plans appear to favor the Republican Party according to some measures, and the Democratic Party according to other measures. Plan Pine is the most favorable to Democratic candidates, but the differences between the three plans are small, amounting to less than a State House seat on average over several elections.

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 reflect less consideration of county boundaries than the maps in the computational ensemble, and contain numerous districts that are not reasonably compact.

PART VIII. ANALYSIS OF PROPOSED MAPS FOR MICHIGAN'S STATE HOUSE DISTRICTS

VIII.1. THE PROPOSED MICHIGAN HOUSE DISTRICT MAPS

The MICRC approved the following Proposed maps for Michigan House of Representatives districts, for consideration in what is scheduled as the final round of public hearings (Nov. 15 – Dec. 29, 2021): [59]

-**Plan Pine V5,** (number #259). Voted 7-4 on Nov. 3, 2021. Commissioners Clark (R), Kellom (D), Orton (R) and Rothhorn (D). Opposed; Curry (D) and Lange (R) not voting.
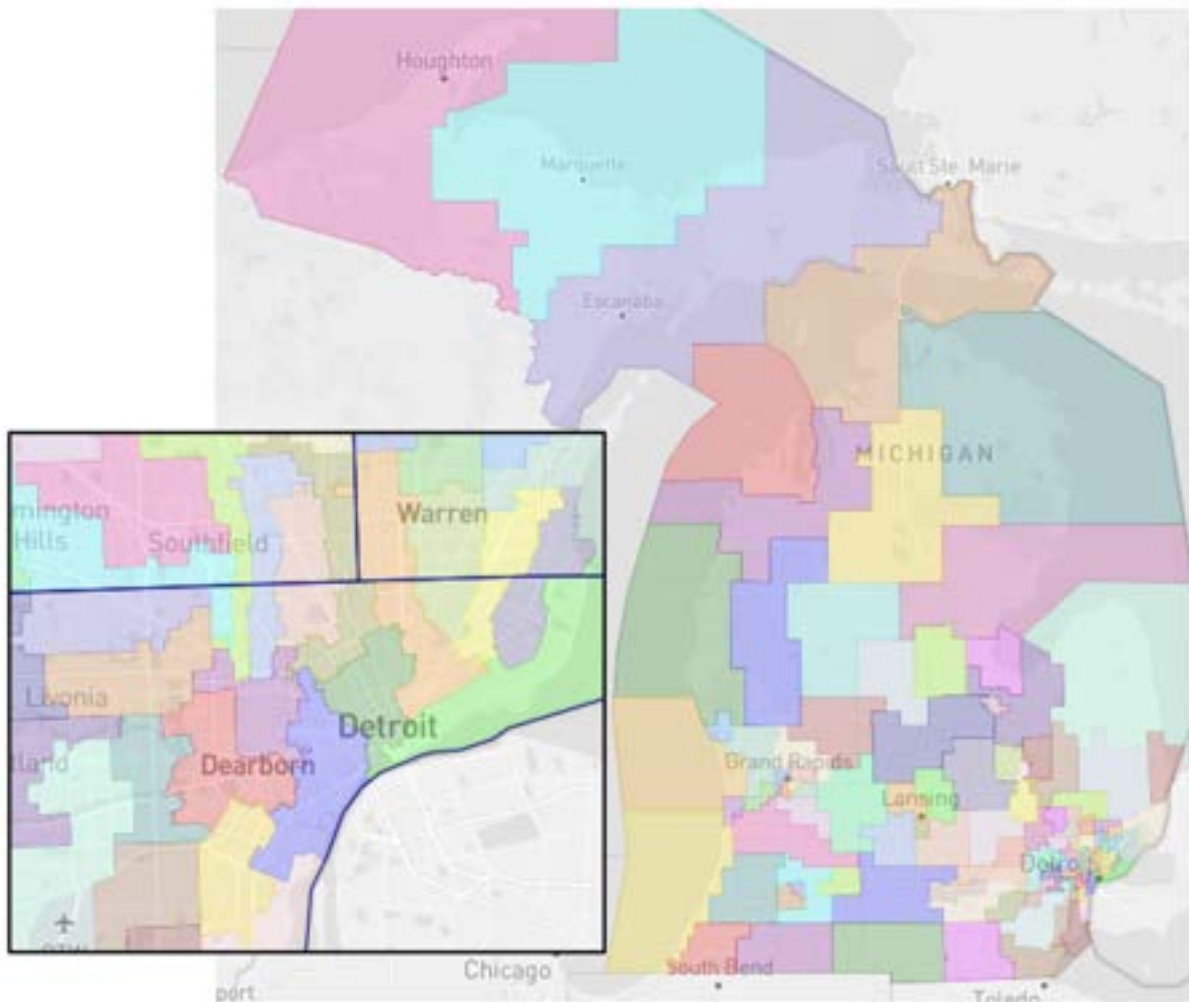
Plan Pine V5

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

-Plan Hickory (number #262). Voted 10-3 on Nov. 4, for publication. Opposed: Commissioners Lange (R), Wagner (R) and Witges (R).
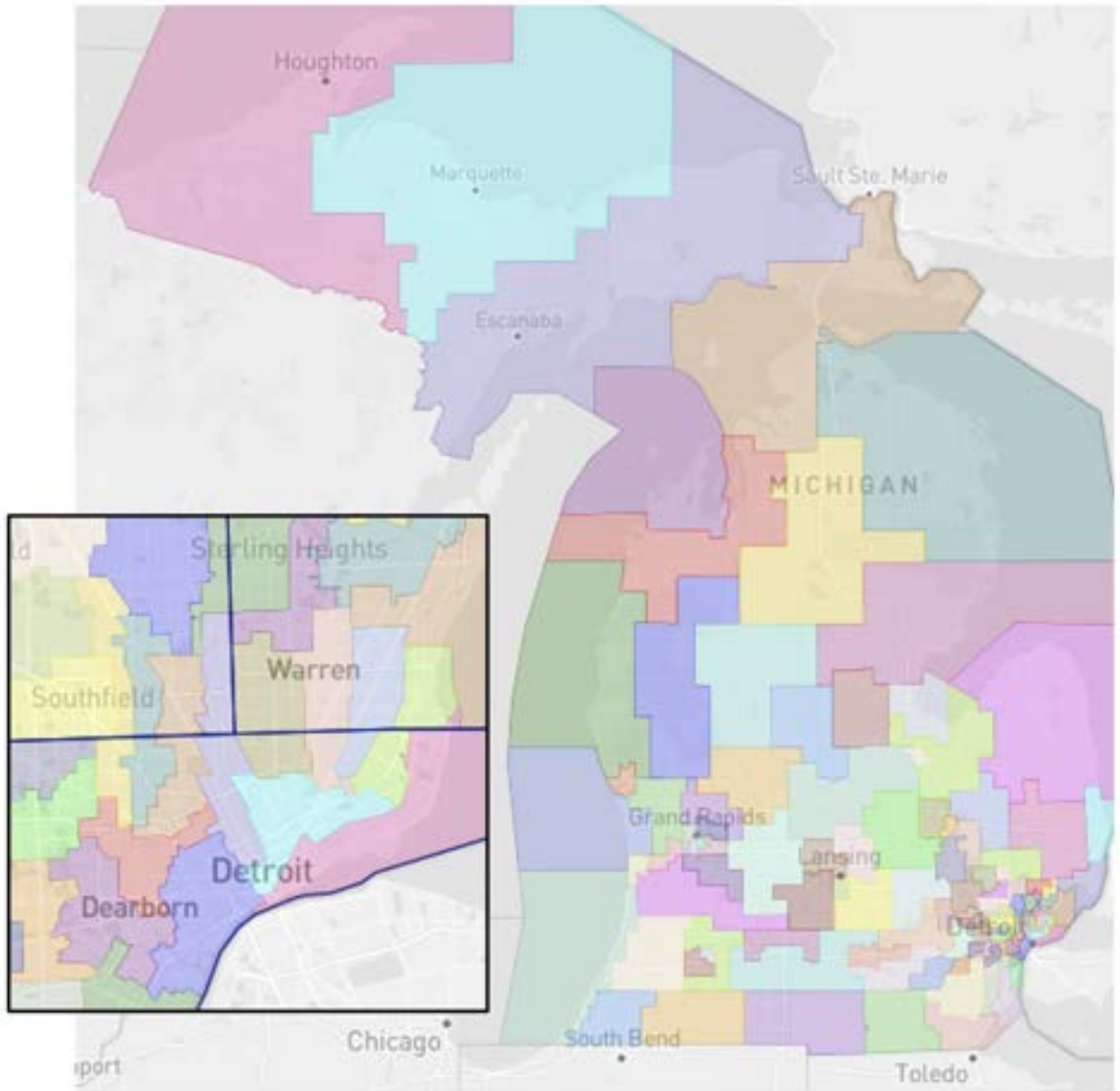
Plan Hickory

-Plan Magnolia (number #263). Voted 11-1 for publication on Nov. 4, 2021. Opposed Commission: Lange (R). Absent commissioner: Wagner (R).
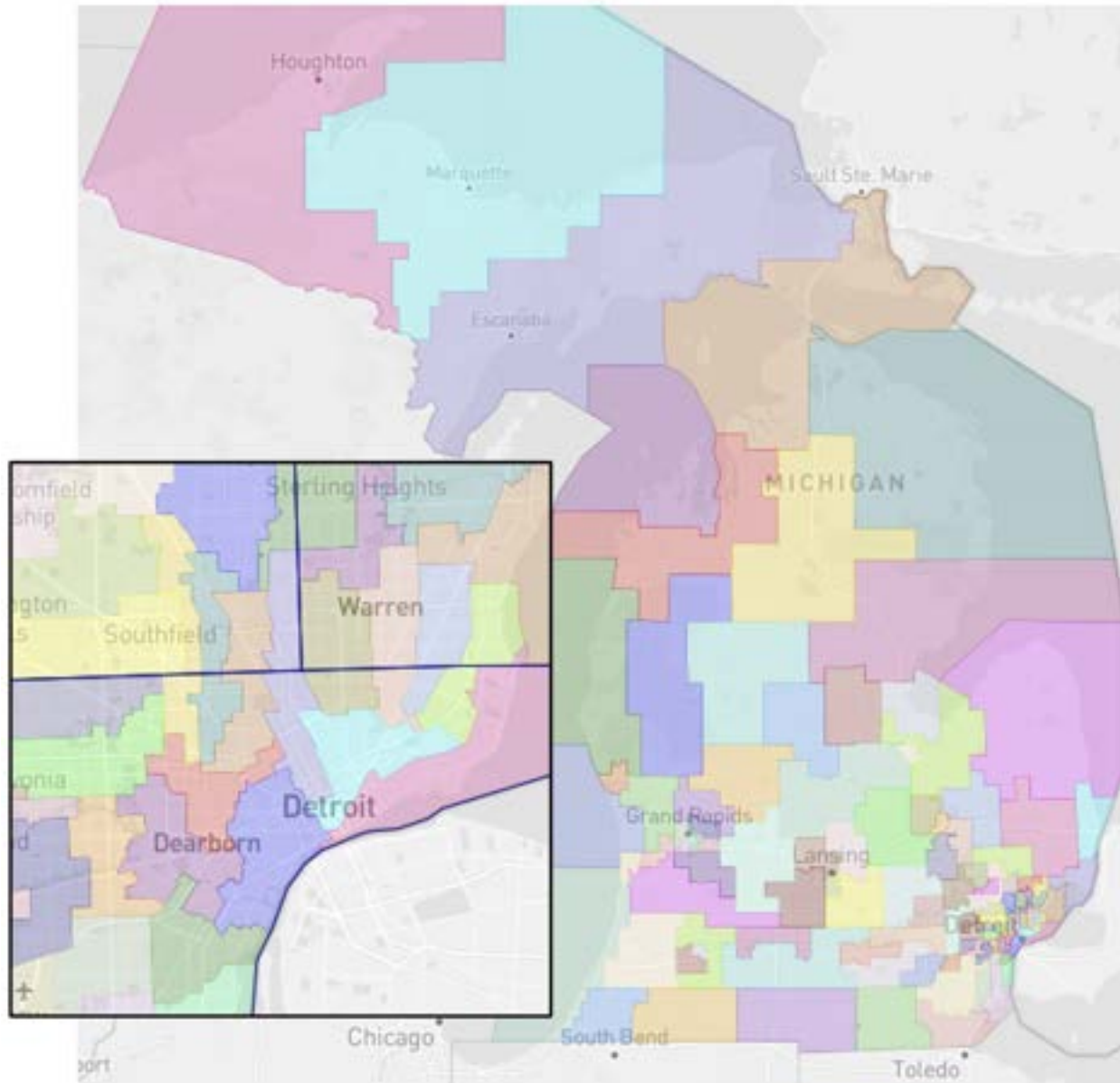
Plan Magnolia

VIII.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.
With regard to population equality, we refer to the discussion under Section VII.2.A on the analysis of Draft maps for state House districts.

With regard to the Voting Rights Act, we refer 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 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 Voting Rights Act.

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 40. *Population Equality in Proposed State House Plans*			
	Population difference	**Maximum deviation**	**Partisan malapport.**
Plan Pine V5	4.86%	2.45%	+0.07%
Plan Hickory	5.09%	2.48%	+0.12%
Plan Magnolia	4.80%	2.48%	+0.15%

As in the case of Proposed Senate District maps, these deviations are within the range that is acceptable for state legislative districts under the U.S. Constitution.

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 (except official map numbers again from IPUMS). These numbers serve as proxy for the number of Black-minority districts of opportunity.

TABLE 41. *Black Minority Districts of Opportunity in State House Proposed Maps*			
	# > 50% VAP Black	# >40% VAP Black	# >35% VAP Black
Plan Pine V5	3	13	19
Plan Hickory	7	13	17
Plan Magnolia	7	13	17
2011 Official Map	11	12	12
Proportional to Pop.	15		

The following graph shows the Black share of the Voting Age Population in the districts with the highest Black populations. Districts are ordered from lowest to highest Black share but only the top 30 districts are included. 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 unusual maps such that only 2.5% of maps have shares above or below the range covered by the arms.
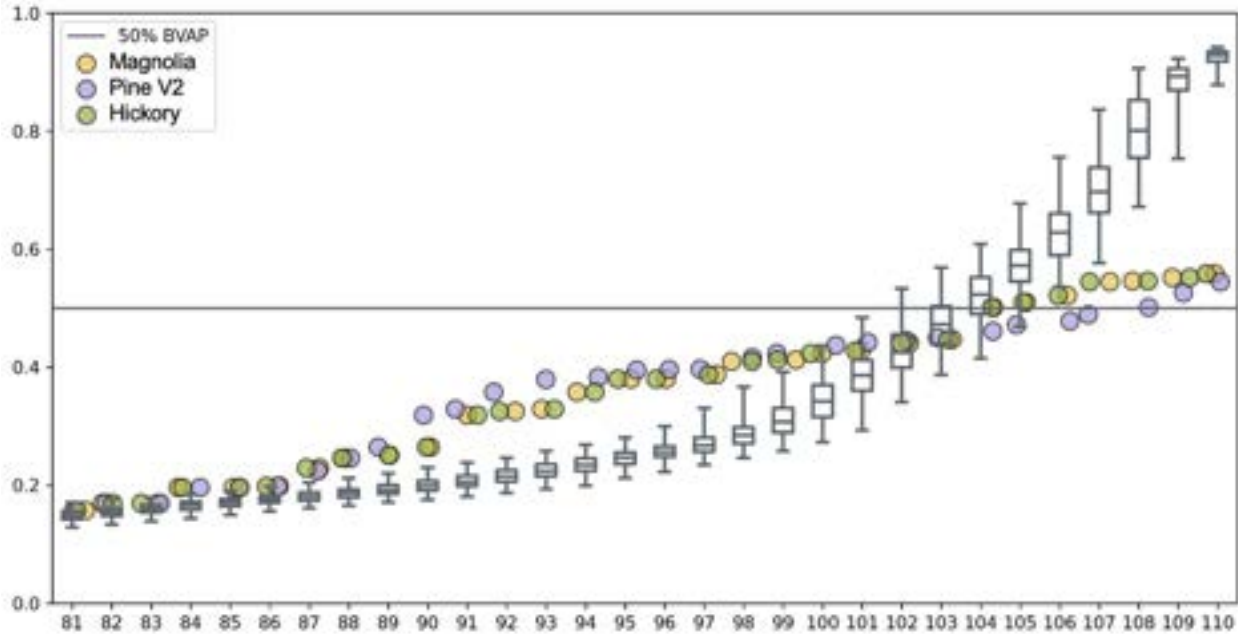
Figure 39. Distribution of Black VAP by State House District

Almost all maps in the Computational Ensemble feature at least five Black-majority districts and a typical map features seven such districts. Proposed Plans Magnolia and Hickory share a common map of districts for the city of Detroit and neighboring areas, and thus have the same results on the distribution of Black Voting Age Population by district. These two plans also feature seven Black majority districts, as is typical of the computational maps, but they arrange the districts radiating outward into suburban areas of Macomb and Oakland counties, and western Wayne County, so that the large urban Black majorities get partially diluted to smaller majorities in these hybrid urban-suburban districts. In addition to the seven majority-Black districts, these plans also create many more districts with a large (but short of a majority) Black Voting Age Population than the maps in the ensemble. The Magnolia/Hickory arrangement is the result of Commissioner Brittni Kellom's efforts to address the public comments during the second round of public hearings earlier this fall.

Proposed Plan Pine V5 follows a hybrid approach between that of Magnolia/Hickory and its predecessor Draft Plan Pine, resulting in only three Black-majority districts, but in a greater number of districts with Black VAP above 40% or above 35%.

We note that all three plans also contain one district with Hispanic share of VAP above 35%, but none above 40% (over 39% 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, which would be five.

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.
All three of these plans satisfy contiguity.

TABLE 42. *Contiguity in Proposed State House plans*	
	Are all districts contiguous?
Plan Pine V5	Yes
Plan Hickory	Yes
Plan Magnolia	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.

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

Results.
Hickory and Magnolia preserve 30 COI clusters and Pine V2 preserves 31. That is slightly below the number preserved by computer-generated maps. Again, most of the preservation comes from districts within large COI clusters rather than COI clusters within districts. We do not see much evidence of responsiveness to COI clusters, though there could be more responsiveness to individual COI maps submitted by the public and selected by the Commission.
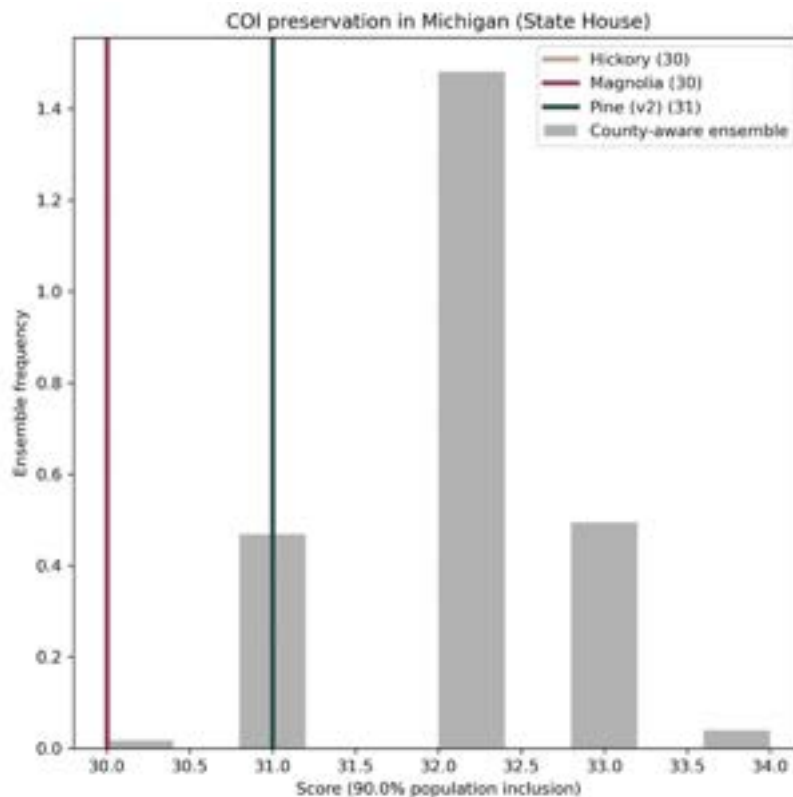

Figure 40. Community of Interest Preservation in State House Maps

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-D3 are exactly as described in Section III.2.D.

D4. **Median-Mean difference.**
Measure D4 is exactly as described in Section VII.2.D on the analysis of Draft plans for state House districts.

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

D6. **Partisan Advantage.**
Measure D4 is exactly as described in Section VII.2.D on the analysis of Draft plans for state House districts.

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 V.2.D8, on the analysis of Senate district plans.

For readers' convenience, we published the three Proposed state House maps in DRA 2020 under the names: "HD Pine V5", "HD Hickory" and "HD Magnolia".

-       -   -

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 U.S. 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 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 votes. The "Outlier" (D7) indicates a party ("D" for Democratic or "R" for Republican) and a range of percentages. The letter indicates the party that this map favors, relative to the 1,000,000 other maps in the Princeton Gerrymandering Project ensemble. The first number is the share of maps in the ensemble that are less favorable to this party (in the sense that the party would obtain fewer seats), and the second is the share of maps that are even more favorable (in the sense that the party would obtain more seats).

TABLE 43. *Measures of Partisan Fairness for Proposed State House District Plans*							
	Bias	Eff. Gap	Proport.	Med-mn	Lopsided	Advantage	Outlier
	D1	D2	D3	D4	D5	D6	D7
Plan Pine V5	+11.4 seats	+2.9%	–1.3 seats	+2.3%	+5.1%	–2.1 seats	D: 100%-0%
Plan Hickory	+11.6 seats	+3.1%	–0.9 seats	+2.4%	+4.8%	–2.4 seats	D: 99.9%-0%
Plan Magnolia	+11.4 seats	+3.4%	–0.7 seats	+2.6%	+5.1%	–2.1 seats	D: 99.9%-0%

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, U.S. Senate, Governor, Secretary of State, and State Attorney General) from 2012 to 2020, and we report them here directly from the MICRC website.

TABLE 44. *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 V5	--	+4.3%	+0.5%	+2.7%	+5.3%	--	--
Plan Hickory	--	+4.3%	+0.5%	+2.7%	+5.3%	--	--
Plan Magnolia	--	+5.4%	+1.4%	+2.9%	+5.7%	--	--

The pattern is similar to the one we identified in Congressional and Senate maps, but the Republican political geography advantage is more pronounced at the level of House legislative districts. For instance, the average map in the Computational Ensemble (a computer suite of maps created for comparison purposes) feature an Efficiency Gap of about 7%. Confronted with this large Republican advantage in the geographic distribution of its voters, the Commission's plans make expected results more favorable for the Democratic Party, in order to partially — but only partially — cancel out the underlying Republican geographic advantage. This is reflected in the negative value of the Partisan Advantage (D6), which suggests that, net of the effect of political geography, the maps slightly favor Democratic candidates (by a bit more than two seats), but not enough to compensate for the large underlying Republican advantage due to the political geography of the state, as shown by measures D1, D2, D4 and D5.

The Commission edited and adjusted Proposed state House maps toward more favorable likely outcomes for Democrats, halving the Efficiency Gap from the 7% that is typical of computational maps (drawn neutrally without partisan considerations), to around 3% in Proposed plans Pine V5, Hickory and Magnolia. However, in doing so, the maps preformed less well on the Outlier Test (D7). State House district maps that minimally reflect county boundaries and compactness are extremely unlikely to bring the Efficiency Gap close to zero. The Commission thus drew proposed maps that are more favorable to Democrats than computer-generated maps. In other words, these maps — and any maps close to 0% Efficiency gap — are outliers, and they do not meet the Outlier test, which calls on maps to be typical rather than more favorable to one or another political party than maps drawn without partisan intent.
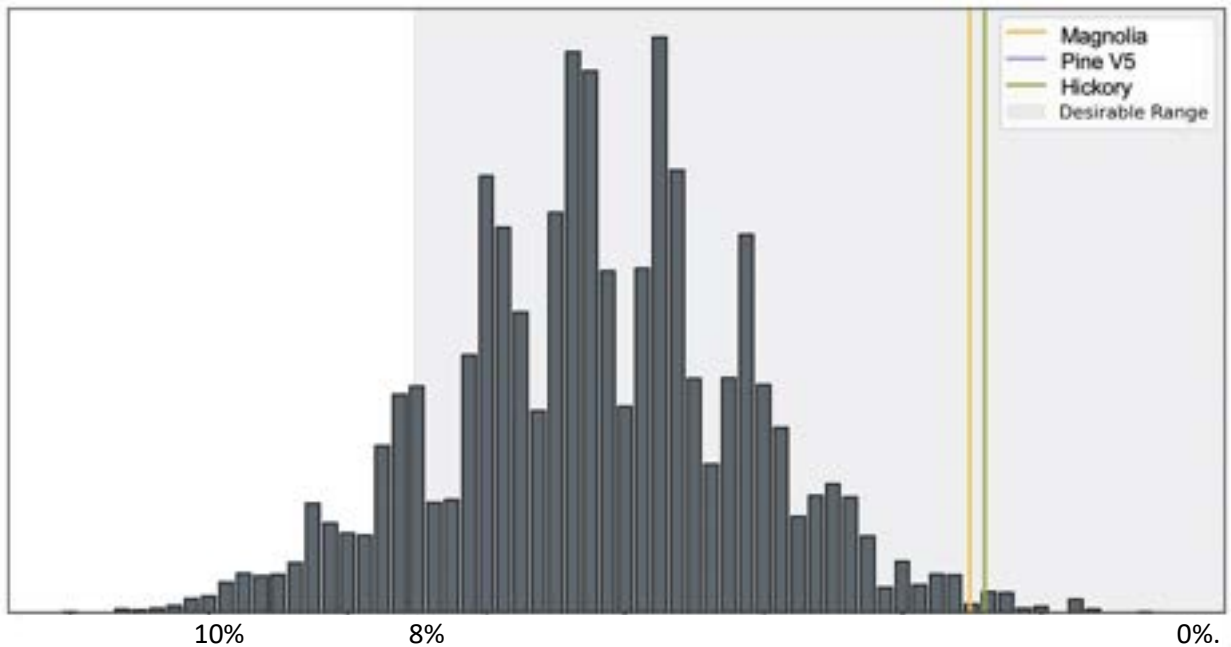

Figure 41. Efficiency Gap given 2018 US Senate Election Results

This is well illustrated by Figure 41. The range of normal Efficiency Gap scores, according to the proposers of this measure, is from -8% to +8%, an area shaded in gray (the horizontal axis goes from more favorable to Republicans to less favorable to Republicans from left to right). It is easy to satisfy this bar, as most maps in the Computational Ensemble fall within this range (as denoted by the height of the bars in the figure). Whereas, hitting zero proved virtually impossible for our computational algorithm. In its effort to draw maps that achieve closer to zero Efficiency Gap, the Commission collaboratively drew maps that feature a lower Efficiency Gap than the vast majority of other maps we have assessed. A lower Efficiency Gap translates into a higher number of seats for the Democratic party, beyond the number proportional to its statewide vote, as shown in the next figure.
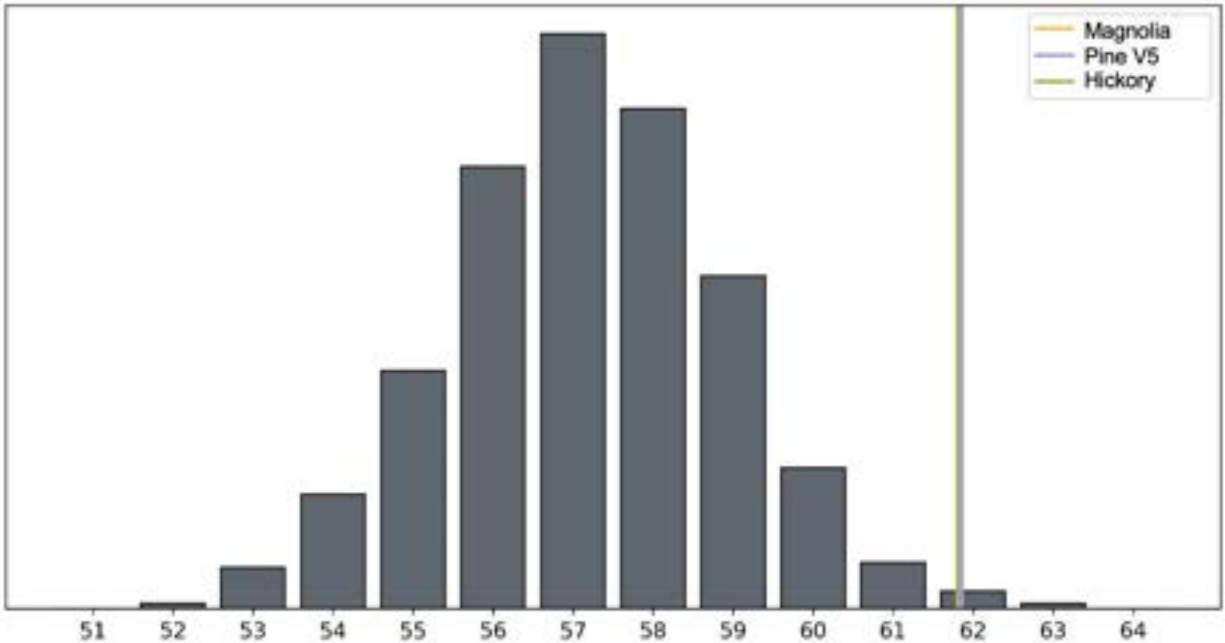
Figure 42. Democratic House seats Given 2018 U.S. Senate Election Results

Based on the 2018 U.S. Senate election results under computer-generated maps, Democrats would predictably win between 54 and 60 seats, with 57 being the most typical number. But under Proposed plans Pine V5, Hickory or Magnolia, Democrats would win 62 seats, overperformance compared to maps drawn without partisan considerations. As a result, these maps are outliers compared to computer-generated maps.

Democrats won this statewide election 52 percent to 46 percent, so the proportional number of seats for Democrats is between 58 and 59. The winning party would normally win a greater share of seats than votes. Reducing the efficiency gap or improving other symmetry scores would achieve outcomes that would give Democrats and Republicans a similar share of House seats in elections in which they won a similar share of the statewide vote. But the concentration of Democrats in urban areas makes that unlikely absent efforts to construct districts with that purpose in mind.

These efforts, if too intense, could put the maps at risk of judicial review, if Courts use the Outlier Test they have used in the past to identify whether a map provides a disproportionate advantage to a political party, and without considering scores on symmetry. If Courts instead compare the maps against symmetric baselines, these maps would be seen as performing well, as they generate slightly more seats for Democrats than the proportional baseline, and slightly less than the number required to fully close the efficiency gap or the median-mean difference.

The next figure replicates an analysis of neutrality with the Princeton computational ensemble of a million maps, using Princeton's composite election results. We get similar results: all three maps are outliers compared to computer-generated maps; Plan Pine V5 more so; in fact, Plan Pine V5 is tied for the most favorable to Democrats among all one million maps in the Princeton Gerrymandering Project's computational ensemble. Again, under these plans, Democrats obtain two or three more seats than under most maps drawn without partisan considerations, and five

or six more than typical for computer-generated maps. By pursuing the goal of better scores on some measures of symmetry, these maps result in lower scores on neutrality.
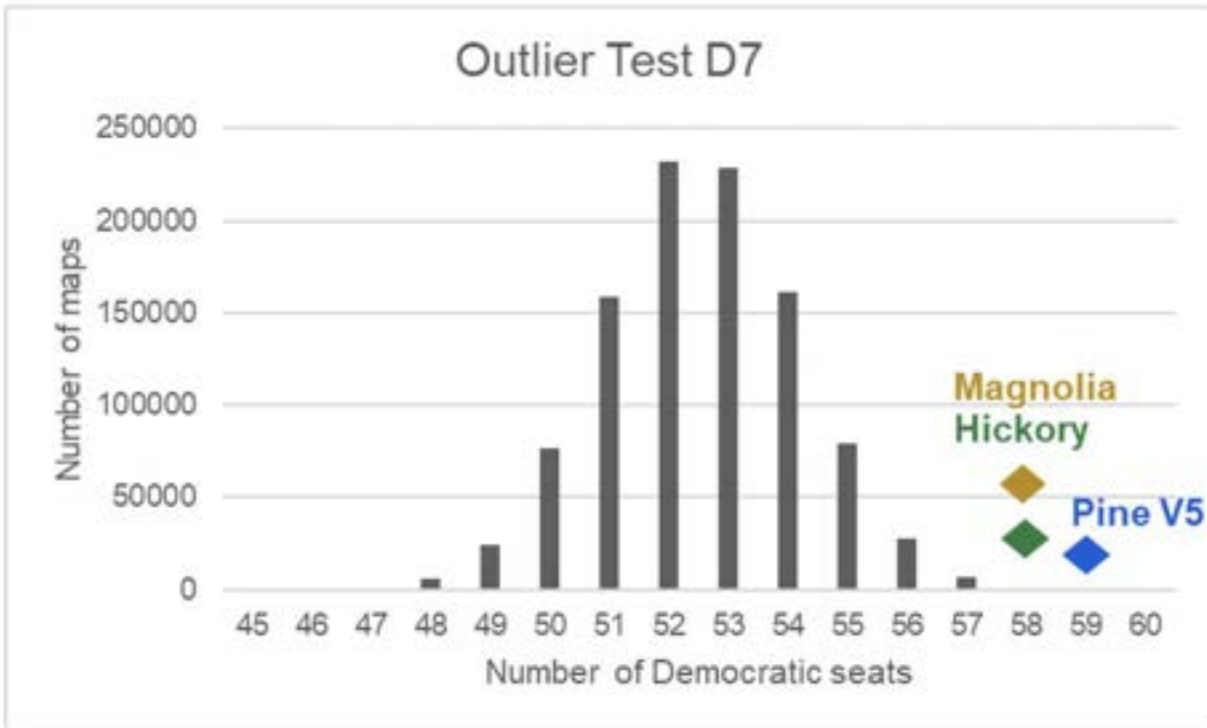

Figure 43. Democratic Seats with Princeton Composite Election Data

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.
We present first results on double-bunking, i.e. assigning two incumbents to the same district. We report two numbers. The first considers all incumbents and uses addresses from the 2020 Michigan Candidate Listing file made public by the MI Secretary of State. With this data, the typical range in the computational ensemble is from 19 to 29, so these three maps all fall within this range.

TABLE 45. Districts with Two Incumbents in Proposed State House District Plans	
Plan Pine V5	22 [11]
Plan Hickory	21 [10]
Plan Magnolia	21 [10]

However, many incumbents are term-limited, and cannot run again, so placing them in the same district with another incumbent is irrelevant. The second number, in brackets, considers only incumbents who are not term-limited, and uses addresses obtained from the Michigan Voter file by Mike Wilkinson for Bridge Michigan.[60]

On competitiveness, if we define a "competitive district" as one that each of the two parties won in at least one of the five elections in the MGGG data set (namely, the 2018 Senate, Governor, Secretary of State, and Attorney General elections, and the 2016 Presidential election), then all three Proposed Senate plans feature 20 such districts, close to the middle of the range of the Computational Ensemble (most maps feature between 13 and 23, with the most frequent being result being 18).

Proposed Plan Pine V5 features 84 election results decided by a less than 6% margin, from among 550 total election results (five elections in each of 110 districts). Proposed Plan Hickory features 91, and Proposed Plan Magnolia features 88. Most maps in the Computational Ensemble feature between 73 and 108, with the most typical number being 90, so the three Proposed plans fall within the normal range.

There is no indication that the Proposed maps favor or disfavor incumbents as a class.

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[60] Sergio Martinez-Beltrán and Mike Wilkinson, "Redistricting may oust half of incumbents in Michigan, analysis finds", November 23, 2021, Bridge Michigan.

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 first present the results in table format.

TABLE 46. Split Jurisdictions and Jurisdictional Splits in Proposed State House Maps.				
	Split Counties	County Pieces	Split Municipalities	Municipality Pieces
Plan Pine V5	48	201	129	328
Plan Hickory	48	202	129	329
Plan Magnolia	48	200	127	323

These plans are very similar with respect to reflecting consideration of county, city and township boundaries. They reflect municipal boundaries more than the computer-generated maps drawn without any attention to municipal boundaries, but they reflect county boundaries less than the computer-generated maps drawn to reflect these boundaries.

This is evidence that the plans reflect jurisdictional boundaries somewhat, more than not at all, but not as much as computer algorithms trained to do so.

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, we 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 DRA 2020, and the Cut Edges is as computed by the MGGG Lab.

TABLE 47. Compactness Measures in Proposed State House District Plans			
	Polsby-Popper	Reock	Cut Edges
Plan Pine V5	0.39	0.41	2631
Plan Hickory	0.38	0.40	2668
Plan Magnolia	0.39	0.41	2635

The Cut Edges scores are poor, at the very high (bad) end of the distribution of the Computational Ensemble. Viewers can confirm, by visual inspection, that compactness was not a guiding factor in the design of these maps.
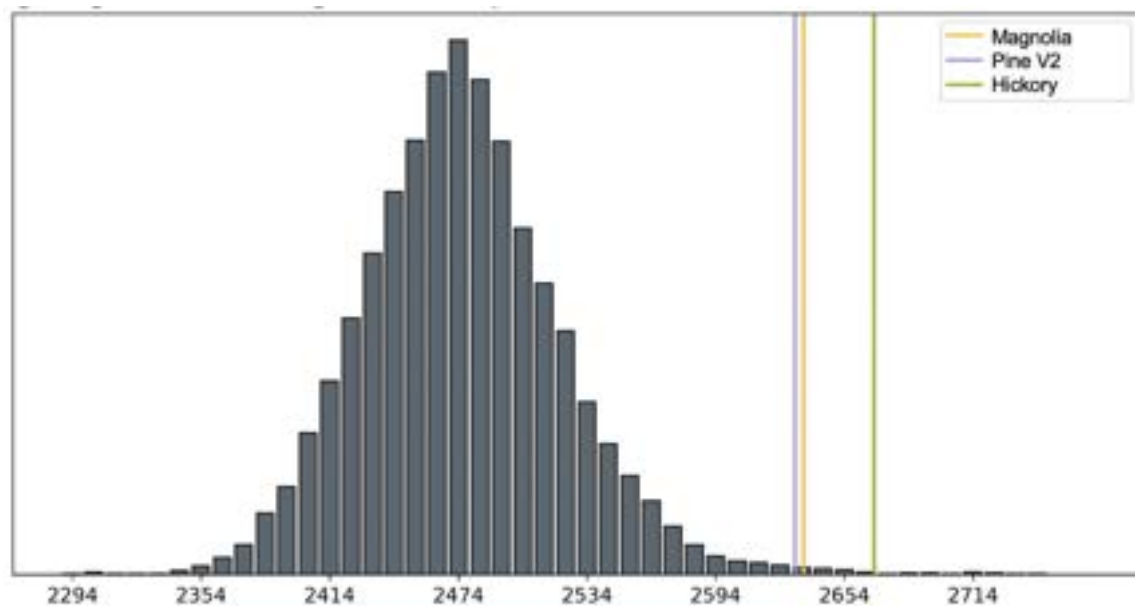

Figure 44. Number of Cut Edges in Proposed House District Plans

VIII.3. SUMMARY OF RESULTS

Proposed plans Pine V5, Hickory, and Magnolia are all complete redistricting plans that divide the entire state into one 110 contiguous districts. The three plans are similar, as they all stem from Draft Plan Pine, and many districts share the same boundaries across all four of these plans. Further, all three Proposed plans feature adjustments to bring the population differences down to approximately 5%, or less than 5,000 inhabitants.

Plan Magnolia and Plan Hickory introduce a new configuration of Detroit districts, as sought by Commissioner Kellom, resulting in compliance with the Voting Rights Act in a manner designed to reflect the communities in the city of Detroit that lessens the consideration of race in the creation of districts (the distribution of racial shares across districts deviates less from the distribution under maps drawn by computer algorithm). Proposed Plan Hickory differs from Proposed Plan Magnolia mostly in Ann Arbor, where Proposed Plan Hickory develops a distinct configuration with a four-district split, while Proposed Plan Magnolia kept the original configuration from Proposed Plan Pine. Proposed Plan Pine V5 adopts neither of these two new configurations in Detroit or Ann Arbor, staying closest to Proposed Plan Pine.

These three plans feature moderately large deviations from population equality: about 5%.

Proposed Plan Magnolia and Proposed Plan Hickory feature seven districts in which a majority of the Voting Age Population identifies as "Black," and an additional six districts with a Black Voting Age Population share above 40%. Proposed Plan Pine V5 features only three districts with a majority of such population, but an additional ten districts with a share above 40%.

Commissioners made efforts to adjust boundaries in response to requests by specific neighborhood-based communities of interests, but the overall approach to reflect communities of interest remains somewhat unsystematic. Specifically, how the Commission prioritized reflecting communities of interest over lower-ranked criteria remains unclear.

Regarding partisan fairness, different measures put starkly different demands on state House District maps in Michigan. The Commission strained to approach a perfect score in two or three measures selected by consultant Dr. Lisa Handley, but in doing so, lowered the score in other measures. In one measure that has been accepted by courts — the Outlier Test — the scores worsened, so that Proposed Plan Pine V5, Proposed Plan Hickory and Proposed Plan Magnolia all appear as outlier maps that give the Democratic Party a higher number of seats than maps drawn without partisan considerations.

These maps appear fair to incumbents and challengers. They reflect county, city and township boundaries to some extent, but less so than maps designed by algorithms instructed to reflect county boundaries. These maps contain several districts that do not appear reasonably compact by visual inspection, and aggregate numerical scores and their comparison to computationally generated maps confirm that the maps perform worse on compactness than other maps.

We find that the approach toward compliance with the VRA in Proposed Plan Magnolia and Proposed Plan Hickory better address the concerns expressed by Detroit residents, including two Democratic Commissioners Juanita Curry and Brittni Kellom, both of Detroit, and by the Department of Civil Rights, regarding representation of the Black community in Detroit.

Both Proposed plans Hickory and Magnolia appear as outlier maps that give a state House advantage to the Democratic Party than almost any computer-generated map. But these maps perform well instead on measures of symmetry that do not consider the geographic distribution of Democrats and Republicans. Both proposed plans Hickory and Magnolia evolved from Draft Plan Pine, itself something of an outlier. In the most recent map drawing, Proposed plans Hickory and Magnolia updated Draft Pine in a way that would be expected to add an extra seat or two for the Democratic party.

Proposed Plan Hickory and Proposed Plan Magnolia perform well on several other measures of partisan fairness, but it would be possible to redraw both to score within a normal range in a larger class of accepted measures of partisan fairness.[61] The Commission has pursued greater partisan fairness on some measures that aim toward symmetry at the expense of scores on measures of neutrality that they did not consider.

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[61] Plan HD Szetela (#276), which is the only House plan submitted by an individual commissioner, also fails the Outlier Test, as it too gives more seats to Democrats than almost any map drawn without partisan considerations. It thus has the same advantages and disadvantages on this criterion.

PART IX. 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.

With the first round of 16 statewide public hearings concluded on July 1 and the necessary Census data made available on August 20, the Michigan Independent Citizens Redistricting Commission met approximately 39 times over 15 weeks for intensive map drawing sessions to design and publish maps for public comment during its second round of five statewide public hearings.

From that public feedback, the Commission published six maps each for the state House of Representatives and state Senate, and eight maps outlining Michigan's Congressional Districts. For each set of those map types, half had been created collaboratively by the entire Commission, while the other half had been designed and submitted by individual commissioners.

The second round of hearings then took place in Detroit, Lansing, Grand Rapids, Gaylord, and Flint from Oct. 20-27, with hundreds of Michigan residents turning out to voice their opinions and

submit additional mapping suggestions. A number of central themes emerged, including those raising questions about:

- **The Voting Rights Act.**
  One of the most common topics addressed by residents was whether the Commission had adequately addressed the U.S. Voting Rights Act (VRA). While the Commission had designed a number of "majority minority" districts, the Commission hadn't designed any with majorities of Black voting age population residents.

  During the earlier August-October mapping sessions, the Commissioners had been advised by their Voting Rights Act consultant and legal counsel that compliance with the VRA could be achieved in Detroit with as little as 35%-40% Black voting age population in a district, and that rising significantly above those targets might unnecessarily pack Black voters into fewer districts than would be appropriate. The Commission followed that advice in drawing the draft districts, but then heard extensive negative feedback about this approach during the second round of public hearings.

- **Partisan Fairness.**
  Another common theme of public comments focused on partisan fairness. Again, following its consultants' advice, the Commission had adopted four measures of partisan fairness: *lopsided margins*, *mean-median difference*, *efficiency gap*, and *seats-vote ratio*. In most of the maps presented during the second round of hearings, many measures demonstrated relatively small but consistent advantages to the Republican Party. In numerous other scenarios, the Democratic Party was projected to win a slight majority of seats. Many commenters urged the MICRC to pursue metrics reflecting zero partisan advantage, though others called for prioritizing other criteria.

- **Communities of interest.**
  A third major theme of feedback focused on Communities of Interest, though public comments often went beyond desires to keep COIs within districts. Many addressed geographic relationships (such as keeping lakeshore districts together or Ottawa County whole) or urban-rural characteristics (such as keeping the City of Midland in an urban district with Bay City and Saginaw vs. keeping Midland in a rural district with Midland and surrounding counties). There was more consensus about avoiding splits of small COIs in the Detroit area.

Following the second round of public hearings, the MICRC went back to the drawing board to adjust its maps in nine additional meetings from Oct. 27 to Nov. 8. During this period, the Commission spent significant time discussing citizen Community of Interest feedback, the Voting Rights Amendment requirement and partisan fairness, while working to ensure the latest maps met all seven constitutional mandates. The Commission continued to receive significant public feedback throughout this final mapping process, much of it mutually conflicting – as had been the case for months. Two controversies rose to prominence during this deliberation period.

- **Transparency of Proceedings.**
  During fall deliberations, the Commission also faced public questions about whether it had the authority to meet in closed session. The Commission had moved into a private session to discuss circumstances of the Voting Rights Act and the history of voting-related discrimination in Michigan. The commission's staff cited attorney-client privilege,

Michigan's Open Meetings Act and Freedom of Information Act in supporting the closed session. The move has prompted lawmakers to seek a state Attorney General review.

- **Collaborative or Individual maps.**
  One more potentially significant debate emerged on Nov. 5, when the Commission broke off mapmaking to seek legal advice asking when individual commissioners could submit their own redistricting plans. The commission asked whether individual commissioners could submit their maps for public comment at the present time or after the final 45-day public comment period. The constitutional amendment governing redistricting, as now understood, allows 45 days of public comment.

  Thereafter, the commission -- late on Monday, November 8 -- paved the way for final public comments and final adoption of the House, Senate and Congressional maps that will govern elections for the next 10 years, barring future legal challenges. The commission forwarded 15 maps – nine collaborative and an additional six from individual commissioners – for public comment.

  These 15 maps are at least one vote away from their final version, and available to view online [here](). The Commission's action, barring further updated maps, now calls for processing the proposed maps, data and legal descriptions necessary for official publication. That work, once completed, will start the 45 days allowed for further public comment before final map adoption. The [commission's calendar]() now calls for a public hearing at the University of Michigan in Ann Arbor on Thursday, Nov. 18, a meeting in downtown Lansing on Thursday, Dec. 2, a session on Thursday, Dec. 16 in downtown Detroit and a final 2021 meeting on Thursday, Dec. 30 in a Lansing location to be determined.

  The state Constitution requires for a majority (seven) Commission vote – from at least two Republicans, two Democrats and three independents – for maps to be approved. Lacking a majority, the commission will rank maps for final approval. If the Commission cannot agree upon a ranking, the Michigan Secretary of State will randomly select final maps among those forwarded by the Commission.

On the positive side, the Commission has not divided into partisan factions, each with a map for consideration. Given the work of other commissions, this was a distinct possibility that has been avoided due to the cooperation and intent of commissioners. The Commission has largely worked cooperatively to propose and edit maps. But that does not mean the process has been free of drama. Commissioners have at times been in open conflict with one another on some issues. There has also been controversy regarding the role of the Chair relative to other Commissioners in determining drawing processes and making judgements comparing the importance of criteria. We are hopeful that the final maps can be approved with consensus and less acrimony.

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 X. RECOMMENDATIONS

In light of our assessment of the new redistricting process so far, and our quantitative analysis of each of the Proposed maps, as of December 1, 2021, we issue a number of suggestions for consideration by the Commission as the redistricting process moves forward toward a final vote on adopted plans, at this point expected on December 30, 2021.

We stress that these are not final recommendations on the entirely of the redistricting process. Rather, we restrict our suggestions to recommendations that are actionable at that stage of the process -- before the Commission votes on adopting the official redistricting plans for 2022-2031, on December 30, 2021. 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.

In the first version of this Report, made public on Oct. 18, 2021, we issued an earlier set of recommendations for consideration during the Second Round of Public Hearings, and up to the vote on Proposed plans on November 5. Those earlier recommendations are below, at the end of this section. We celebrate that the Proposed maps reflect much progress toward resolving many of the concerns expressed in those earlier recommendations.

The Commission fully addressed our first and third recommendations by resolving all the discrepancies between the population assigned to districts and the total population of Michigan, and resolved all of the contiguity violations as well, so that all the Proposed maps are complete redistricting plans with contiguous districts. It partially addressed our second recommendation, by revising the state legislative maps toward greater population equality. And it partially addressed our fourth recommendation by reassessing its approach toward compliance with the VRA in the Proposed plans for state House districts.

In the version 2.0 of this report, made public on Nov. 15, 2021, we suggested that if it were possible to revisit their decisions, the Commission could correct problems that unnecessarily reduce their compliance with constitutional criteria and increase their legal risk. We made two suggestions for immediate consideration. The first was to reduce population inequality in its Congressional maps. The current maps unnecessarily put the Commission at legal risk and reduce performance on the top constitutional criterion without any substantive gain. We noted that the task of reducing the deviations from population equality could be delegated or performed quickly by moving small border areas from districts with above-average population to neighboring districts with below-average population, and would not require substantial edits, nor focusing on controversial areas of prior maps.

Second, we suggested that the Commission should elevate Plan SD Kellom's state Senate map to the status of a Proposed map with equal standing with the collaborative ones, so that it can be considered in the initial round of voting without moving to a more complicated ranked choice procedure. It is currently the only state Senate map that uses a revised Voting Rights Act compliance strategy, matching the Commission's collaborative efforts in their state House maps. Not considering this map again exposes the Commission to unnecessary risk at not achieving its top criterion.

We also made —and we nor reiterate— the following recommendations for consideration during the final round of public hearings:

1. With regard to the maps for Congressional Districts, we recommend that the Commission not adopt Plan Apple V2 without considerable explication, as the other two Proposed plans perform better on most criteria. Given the better performance of Plan Chestnut over Plan Birch V2 on some criteria, and their similar performance across other criteria, we recommend that the Commission articulate why it would prefer Plan Birch V2 over Plan Chestnut, if it chooses to do so, as to justify the greater population inequality.

2. With regard to the maps for state Senate district, we recommend that the Commission consider individual commissioner Plan SD Kellom (#270) as an alternative. We believe that Plan SD Kellom #270's compliance with the Voting Rights Act is less controversial than the three collaborative Proposed Senate plans. Further, we find that Plan SD Kellom #270 scores better than Plan Cherry V2 or Plan Linden on many other measures of compliance with the criteria.

3. With regard to the maps for state House districts, we recommend that the Commission not adopt Plan Pine V5 without considerable explication, as Plan Magnolia and Plan Hickory comply with the Voting Rights Act in a manner that is less controversial and that reflects Black communities in and around Detroit. A possible concern with both Plan Magnolia and Plan Hickory is that they are outlier maps that deliver more seats to candidates of one party (the Democratic party) than maps drawn without partisan considerations, but mitigating this concern, Plan Magnolia and Plan Hickory perform well on most other notions of partisan fairness that aim for symmetry without regard to the geographic distribution of Democrats and Republicans.

4. We recommend that the Commission accompany the final adoption of a congressional Plan with a written memorandum justifying why the population inequality in the adopted plan is needed to fulfill the seven criteria spelled out in the Michigan Constitution.

5. We recommend that the Commission accompany the final adoption of each Plan with a written memorandum explaining how the adopted plan complies with the Voting Rights Act, and how it reflects specific communities of interest in the state of Michigan. Those explanations should explain not just which communities were protected in each plan, but why they selected those communities to protect among the many that were submitted by the Michigan public. Their explanation for Voting Rights Act compliance should include more than a target percentage of Black residents in each district, with attention to the non-racial considerations that drove their decisions.

6. We recommend that the Commission bear in mind that reflecting Communities of Interest is a high constitutional priority. We acknowledge that our measures of COI cluster inclusion were not those the Commission chose to maximize. We offer them as guides only because we lacked a Commission-approved list of COIs that they sought to protect. Some criteria for exclusion of COIs might include that they are too large to include in districts or that they reflect attempts by citizens to design their entire district, rather than submit a cohesive community that could be included within one district.

7. With regard to Partisan Fairness, we recommend that the Commission consider a broader set of accepted measures of partisan fairness, and in particular measures that Courts have used to rule on partisan gerrymandering cases.[62] We acknowledge that the Commission has selected some accepted measures of partisan fairness, those based on symmetry, and sought to draw fair maps. But we note that the maps may be challenged under notions of fairness based on neutrality, where maps are compared against maps drawn without partisan considerations.

8. We recommend that in considering public comments, the Commission keep its focus on constitutional criteria. The Commission does not need to adopt the 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.

For completeness and archiving, here are the recommendations we made for consideration during the second round of public hearings.

1. Six of the 10 Draft 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 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

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[62] 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.

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. All three House plans feature small violations of contiguity: isolated census blocks are assigned to a different district than all the census blocks around them. We recommend that these violations of contiguity be fixed by reassigning each isolated census block to the district that surrounds it (or to any of the districts adjacent to them, if the isolated block is at a district boundary.)

4. 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.[63] 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.

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

5. 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 plans reflect them. Some districts others appear to break apart communities.[64] 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 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.

6. 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.[65] 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).

7. 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.

These recommendations complete our interim report on Proposed Redistricting Plans for Michigan. A full Final Report will follow in 2022. We thank commissioners for their work on behalf of all citizens of Michigan, and we look forward to a final vote and to the adoption of Michigan electoral district plans for 2022-2031.

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[64] 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/

[65] 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 XI. 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.[66]

The first U.S. census was initiated in 1790.[67] 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.[68] 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.[69] 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.[70]

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.[71]

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