Ohio Redistricting Assessment
Prepared for the Michigan Redistricting Committee
March, 2021
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Redistricting Amendment Goals and Criteria
(from: https://votersnotpoliticians.com/redistricting-amendment-criteria/)

Goal: the process is transparent, fair, and impartial

Criteria (in order of priority):

A. Federal Law
1. Equal population districts
2. Does not dilute minority votes

B. Contiguity
1. Districts must be physically connected

C. Communities of Interest
1. Draw district lines while keeping shared cultural, historical, or economic interests in mind based on the feedback they receive from the public.

D. No party advantage
1. No unfair or disproportionate advantage to any political party.
Measured by efficiency gap, majority-majority standard, proportionality standard, partisan symmetry standard, responsiveness test, difference of means electoral margin test..

E. Incumbents and candidates
1. No favor or disfavor for either

F. Boundaries
1. Consider existing political boundaries - city and county lines

G. Compact
1. Must be "reasonably" compact. Measured by some boundary complexity metric, a compactness metric, or balanced with population distribution

Other notes
Currently, Michigan has two majority-minority districts, both in Detroit. Ohio has one, in Cleveland.

It may be helpful to contrast the population and demographics of Ohio using 2010 data, as used in the redistricting plans, with recent estimates for Michigan. I have used the numbers from the districtr.org site for Ohio, while I used 2019 US Census estimates for Michigan. Note that the US Census treats the Hispanic or Latino category as an ethnicity, meaning that people identifying with this ethnicity also report one or more race categories. As a consequence percentages won't sum to 100.

	Ohio (2010)	Michigan (2019)
Population	11,689,100	9,986,857
White	81.1	79.2
Black	12.0	14.1
Asian	1.7	3.4
Native	0.2	0.7
Two Races	1.8	2.5
Hispanic	3.1	5.3

Ohio data from districtr.org. Michigan data from https://www.census.gov/quickfacts/MI. Total populations are from US Census sources. Race and ethnicity identifiers are those used on districtr.org. All numbers are percentages, except for population totals.

This table indicates that Michigan today is likely to be somewhat more racially and ethnically diverse than Ohio was in 2010. However, the only non-white Michigan groups in this table with numbers large enough to theoretically comprise a majority in at least one US House district are Black or African Americans and Hispanic or Latinos.

Assessments of Ohio Redistricting Plans
I do not have a name for each plan, so I refer to them by the number that ends each URL. For example, the plan at https://districtr.org/plan/13232 is 13232.

Plan 13232
A1 (equal population): Districts are not equal in population. The largest deviation is 2.23%. 1,639 people are unassigned. They are located in a single district in Brown County along the Ohio River, and should be in District 14.

A2 (doesn't dilute minority districts): One majority minority district. One other ~33%. Five of 15 districts have black populations exceeding the statewide average, while six of 15 districts have hispanic populations exceeding the statewide average.

B1 (contiguity): Districts appear visually to be contiguous at a broad scale. Closer investigation reveals "islands" of one district inside another. For example, check Marysville, northwest of Columbus.

C1 (communities of interest): A visual assessment suggests that most districts are either largely urban or largely small-city or rural. An exception is District 7 in northwest Ohio, which covers extensive rural areas plus the city of Toledo. I can not assess this category more quantitatively at this time.

D1 (no party advantage):
Using 2016 voting data, this plan creates districts with different proportions of Democratic and Republican votes. Here's a table with breakdowns of R&D voting percentages (for president, since using house or senate totals may introduce incumbent advantages) within each proposed house district.

D >5%	3
D 1-5%	2
Tossup	0
R 1-5%	3
R >5%	7

This breakdown suggests that in 2016 Republicans would have won 10 seats (66%) and Democrats would have won 5 seats (33%). Statewide, 54.26% of votes were cast for the Republican presidential candidate. The proportion of seats does not closely match that statewide total; if house seats were chosen from a proportional statewide vote, Republicans would hold an 8-7 edge instead of a 10-5 edge.

Using 2016 Presidential election totals for each district as a proxy, net wasted votes and the efficiency gap were calculated.

Net Wasted Votes	387,890
Efficiency Gap	7.1%

This results indicates a significant bias towards the Republican Party, with nearly 388 thousand more votes "wasted" on Democratic candidates than on Republican candidate.

E1 (incumbents and candidates):
I have no data to assess this, but if districts were drawn without regard to the current district boundaries, this criterion is satisfied.

F1: (considers boundaries)
Ohio has 88 counties. I think that 11 counties have been split between two or more districts. Most are counties in large metropolitan areas. While it is desirable to avoid splitting counties, it is hard to satisfy the equal population criterion without doing so, especially for large population counties.

I did not have a chance to evaluate splitting of civil division (city) areas. The most obvious such split on this map is for Columbus, the largest city and state capital, which has been divided down the middle.

This is a challenge in redistricting: splitting metro regions into multiople districts, especially when extensive suburban and rural areas are included in some of those districts, may be perceived as cracking those populations and diluting urban votes. At the same time, the equal population criterion is difficult or impossible to meet without doing some of this.

For example, consider the Columbus metro area. The two districts that encompass the city itself (9 and 10) are either safely Democratic or lean Democratic. Other districts in the broader metro area extend across large areas and are generally strongly Republican.

G1: (compact):
Polsby-Popper compactness indexes ranged from 0.26 to 0.53 with a mean index value of 0.4. Higher p-p indexes (closer to 1) indicate more compact districts (closer to circular).

Plan 13212
A1 (equal population): 14 of 15 districts are very close to equal in population, with a range of only 2,000 people (0.2%). However, district 15 has just 360,782 people (47% the size of others), and 400K people are unassigned. They are in many precincts scattered throughout the state.

A2 (doesn't dilute minority districts): No majority minority districts. One district exceeds 40% minority, one other exceeds 30%, and one other exceeds 20%. This might be considered diluted. Six of

15 districts have black populations exceeding the statewide average, while four of 15 districts have hispanic populations exceeding the statewide average.

B1 (contiguity): Districts appear visually to be contiguous at a broad scale. Closer investigation reveals "islands" of one district inside another. For example, check Centerburg, a few miles northeast of Columbus.

C1 (communities of interest): A visual assessment suggests that most districts are either largely urban or largely small-city or rural.

D1 (no party advantage): Using 2016 voting data, this plan creates districts with different proportions of Democratic and Republican votes. First, here's a table with the breakdowns of R&D voting percentages (for president, since using house or senate totals may incorporate incumbent advantages) within each proposed house district.

D >5%	2
D 1-5%	2
Tossup	0
R 1-5%	3
R >5%	8

This breakdown suggests that in 2016 Republicans would have won 11 seats (73%) and Democrats would have won 4 seats (27%). Statewide, 54.26% of votes were cast for the Republican presidential candidate. The proportion of seats does not closely match that statewide total; if house seats were chosen from a proportional statewide vote, Republicans would hold an 8-7 edge instead of a 11-4 edge.

Using 2016 Presidential election totals for each district as a proxy, net wasted votes and the efficiency gap were calculated.

Net Wasted Votes	236,988
Efficiency Gap	4.3%

This value indicates a bias towards the Republican Party, with nearly 234 thousand more votes "wasted" on Democratic candidates than on Republican candidate. However, a gap of 4.3% does not appear extreme.

E1 (incumbents and candidates): I have no data to assess this, but if districts were drawn without regard to the current district boundaries, this criterion is satisfied.

F1: (considers boundaries): Ohio has 88 counties. I think that 31 counties have been split between two or more districts. There are also many unassigned precincts scattered through the state.

G1: (compact): I could not calculate this reliably, as manual editing of the underlying geographic data would have been necessary.

Plan 13209

A1 (equal population): Districts are not equal in population. However, the range is only about 20,000 people (2.3%). No people are unassigned.

A2 (doesn't dilute minority districts): One majority minority district. One other district is just over 40%, one other is over 20%. Five of 15 districts have black populations exceeding the statewide average, while five of 15 districts have hispanic populations exceeding the statewide average.

B1 (contiguity): Districts appear visually to be contiguous at a broad scale. No inclusions were apparent.

C1 (communities of interest): A visual assessment suggests that most districts are either largely urban or largely small-city or rural. An exception is District 10, which includes the city of Dayton and three much more rural counties to its east.

D1 (no party advantage): Using 2016 voting data, this plan creates districts with different proportions of Democratic and Republican votes. First, here's a table with the breakdowns of R&D voting percentages (for president, since using house or senate totals may incorporate incumbent advantages) within each proposed house district.

D >5%	2
D 1-5%	3
Tossup	2
R 1-5%	1
R >5%	7

This breakdown suggests that in 2016 Republicans would have won 9 seats (60%) and Democrats would have won 6 seats (40%). Statewide, 54.26% of votes were cast for the Republican presidential candidate. The proportion of seats closely matches that statewide total; if house seats were chosen from a proportional statewide vote, Republicans would hold an 8-7 edge instead of a 9-6 edge.

Using 2016 Presidential election totals for each district as a proxy, net wasted votes and the efficiency gap were calculated.

Net Wasted Votes	54,112
Efficiency Gap	1%

This value indicates a slight bias towards the Republican Party, with 54 thousand more votes "wasted" on Democratic candidates than on Republican candidate. However, a gap of 1% is rather small.

E1 (incumbents and candidates): I have no data to assess this, but if districts were drawn without regard to the current district boundaries, this criterion is satisfied.

F1: (considers boundaries): Ohio has 88 counties. I think that 29 counties have been split between two or more districts.

G1: (compact): Polsby-Popper compactness indexes ranged from 0.16 to 0.55 with a mean index value of 0.32. Higher p-p indexes (closer to 1) indicate more compact districts (closer to circular).

Plan 13151

A1 (equal population): Districts are not equal in population. 13 of 15 are close - within 9,000 people. One district is about 33K people too large, or 4.3%, and one is about 66K people too small, or 8.6%. All population is assigned. (this plan changed during my assessment, so numbers may differ now!)

A2 (doesn't dilute minority districts): No majority minority district. One nearly 40%, one at 25%. Three of 15 districts have black populations exceeding the statewide average, while four of 15 districts have hispanic populations exceeding the statewide average.

B1 (contiguity): Districts appear visually to be contiguous at a broad scale. Closer investigation reveals "islands" of one district inside another. For example, check Sabina, a few miles west of Washington Court House in southern Ohio. These may in part be due to the topological quality, or lack thereof, of the precinct polygon data.

C1 (communities of interest): A visual assessment suggests that most districts are either largely urban or largely small-city or rural.

D1 (no party advantage): Using 2016 voting data, this plan creates districts with different proportions of Democratic and Republican votes. First, here's a table with the breakdowns of R&D voting percentages (for president, since using house or senate totals may incorporate incumbent advantages) within each proposed house district. Two districts had 0 population assigned when I evaluated, so only 13 districts are considered.

D >5%	3
D 1-5%	1
Tossup	0
R 1-5%	1
R >5%	8

This breakdown suggests that in 2016 Republicans would have won 9 seats (69%) and Democrats would have won 4 seats (31%). Statewide, 54.26% of votes were cast for the Republican presidential candidate. The proportion of seats does not match that statewide total; if house seats were chosen from a proportional statewide vote, Republicans would hold an 7-6 edge instead of a 9-4 edge.

E1 (incumbents and candidates): I have no data to assess this, but if districts were drawn without regard to the current district boundaries, this criterion is satisfied.

F1: (considers boundaries): Ohio has 88 counties. I think that 28 counties have been split between two or more districts.

G1: (compact): I could not calculate this reliably, as manual editing of the underlying geographic data would have been necessary and I lacked time to do so.

Plan 13160

A1 (equal population): Districts are very close to equal in population, all within 3,000 people. The deviation is under 0.5%. All population is assigned.

A2 (doesn't dilute minority districts): No majority minority districts. One is 44%, and one is just over 30%. Six of 15 districts have black populations exceeding the statewide average, while six of 15 districts have hispanic populations exceeding the statewide average.

B1 (contiguity): Districts appear visually to be contiguous at a broad scale. Closer investigation reveals "islands" of one district inside another. For example, check Morristown, a in southeastern Ohio a few miles west of Wheeling, WV.

C1 (communities of interest): A visual assessment suggests that most districts are either largely urban or largely small-city or rural.

D1 (no party advantage): Using 2016 voting data, this plan creates districts with different proportions of Democratic and Republican votes. First, here's a table with the breakdowns of R&D voting percentages (for president, since using house or senate totals may incorporate incumbent advantages) within each proposed house district.

D >5%	4
D 1-5%	2
Tossup	0
R 1-5%	2
R >5%	7

This breakdown suggests that in 2016 Republicans would have won 9 seats (60%) and Democrats would have won 6 seats (40%). Statewide, 54.26% of votes were cast for the Republican presidential candidate. The proportion of seats closely matches that statewide total; if house seats were chosen from a proportional statewide vote, Republicans would hold an 8-7 edge instead of a 9-6 edge.

Using 2016 Presidential election totals for each district as a proxy, net wasted votes and the efficiency gap were calculated.

Net Wasted Votes	97,473
Efficiency Gap	1.8%

This value indicates a slight bias towards the Republican Party, with 97 thousand more votes "wasted" on Democratic candidates than on Republican candidate. However, a gap of 1.8% is rather small.

E1 (incumbents and candidates): I have no data to assess this, but if districts were drawn without regard to the current district boundaries, this criterion is satisfied.

F1: (considers boundaries): Ohio has 88 counties. I think that 29 counties have been split between two or more districts.

G1: (compact): Districts visually appear to be compact. Polsby-Popper compactness indexes ranged from 0.32 to 0.57 with a mean index value of 0.42. Higher p-p indexes (closer to 1) indicate more compact districts (closer to circular).

Plan 13278

A1 (equal population): Districts are very close to equal in population, all within 6,000 people. The deviation is under 0.6%. 6,181 people were not assigned - a couple of precincts in different parts of the state.

A2 (doesn't dilute minority districts): One majority minority district. One is 35%, and one is 33%. Five of 15 districts have black populations exceeding the statewide average, while six of 15 districts have hispanic populations exceeding the statewide average.

B1 (contiguity): Districts appear visually to be contiguous at a broad scale. Closer investigation reveals "islands" of one district inside another. For example, check Bradner, south of Toledo and east of Bowling Green.

C1 (communities of interest): A visual assessment suggests that most districts are either largely urban or largely small-city or rural.

D1 (no party advantage): Using 2016 voting data, this plan creates districts with different proportions of Democratic and Republican votes. First, here's a table with the breakdowns of R&D voting percentages (for president, since using house or senate totals may incorporate incumbent advantages) within each proposed house district.

D >5%	4
D 1-5%	1
Tossup	0
R 1-5%	2
R >5%	8

This breakdown suggests that in 2016 Republicans would have won 10 seats (67%) and Democrats would have won 5 seats (33%). Statewide, 54.26% of votes were cast for the Republican presidential candidate. The proportion of seats does not closely match that statewide total; if house seats were chosen from a proportional statewide vote, Republicans would hold an 8-7 edge instead of a 10-5 edge.

Using 2016 Presidential election totals for each district as a proxy, net wasted votes and the efficiency gap were calculated.

Net Wasted Votes	539,243
Efficiency Gap	9.9%

This value indicates a substantial bias towards the Republican Party, with 540 thousand more votes "wasted" on Democratic candidates than on Republican candidate. A gap of 9.9% is quite large.

E1 (incumbents and candidates): I have no data to assess this, but if districts were drawn without regard to the current district boundaries, this criterion is satisfied.

F1: (considers boundaries): Ohio has 88 counties. I think that 47 counties have been split between two or more districts.

G1: (compact): Visually, several districts are long and narrow (Districts 2 and 4), or have particularly non-compact shapes (District 13). Polsby-Popper compactness indexes ranged from 0.05 to 0.43 with a mean index value of 0.24. Higher p-p indexes (closer to 1) indicate more compact districts (closer to circular).

Criteria	**13232**	**13212**	**13209**	**13160**	**13278**
A1 (equal pop)	No (2.23%)	No (47%)	No (2.3%)	Yes (0.5%)	Yes (0.6%)
A2 (minority districts)	Yes (1 MM Dist)	No (0 MM Dist)	Yes (1 MM Dist)	No (0 MM Dist)	Yes (1 MM Dist)
B1 (contiguity)	No	No	Yes	No	No
C1 (comm. of interest)	Maybe	Maybe	Maybe	Maybe	Maybe
D1 (no party advantage)	No (7% EG, +2)	No (4% EG, +3)	Yes (1% EG, +1)	Yes (2% EG, +1)	No (10% EG, +2)
E1 (incumbents)	Yes	Yes	Yes	Yes	Yes
F1 (boundaries)	11 co Splits	31 co splits	29 co splits	29 co splits	47 co splits
G1 (compact)	0.4 PP	Not Calculated	0.32 PP	0.42 PP	0.24 PP

Table comparing five of the maps reviewed above across all eight criteria.

A major advantage of laying out criteria and metrics – both descriptive and numeric or data-driven – is that alternative plans can be compared with one another. While I haven't done that here, each plan can be scored by those criteria so that they might be ranked or sorted. Further, it may be clear that some plans are not acceptable due to one or more criteria, even if they score well on the others.