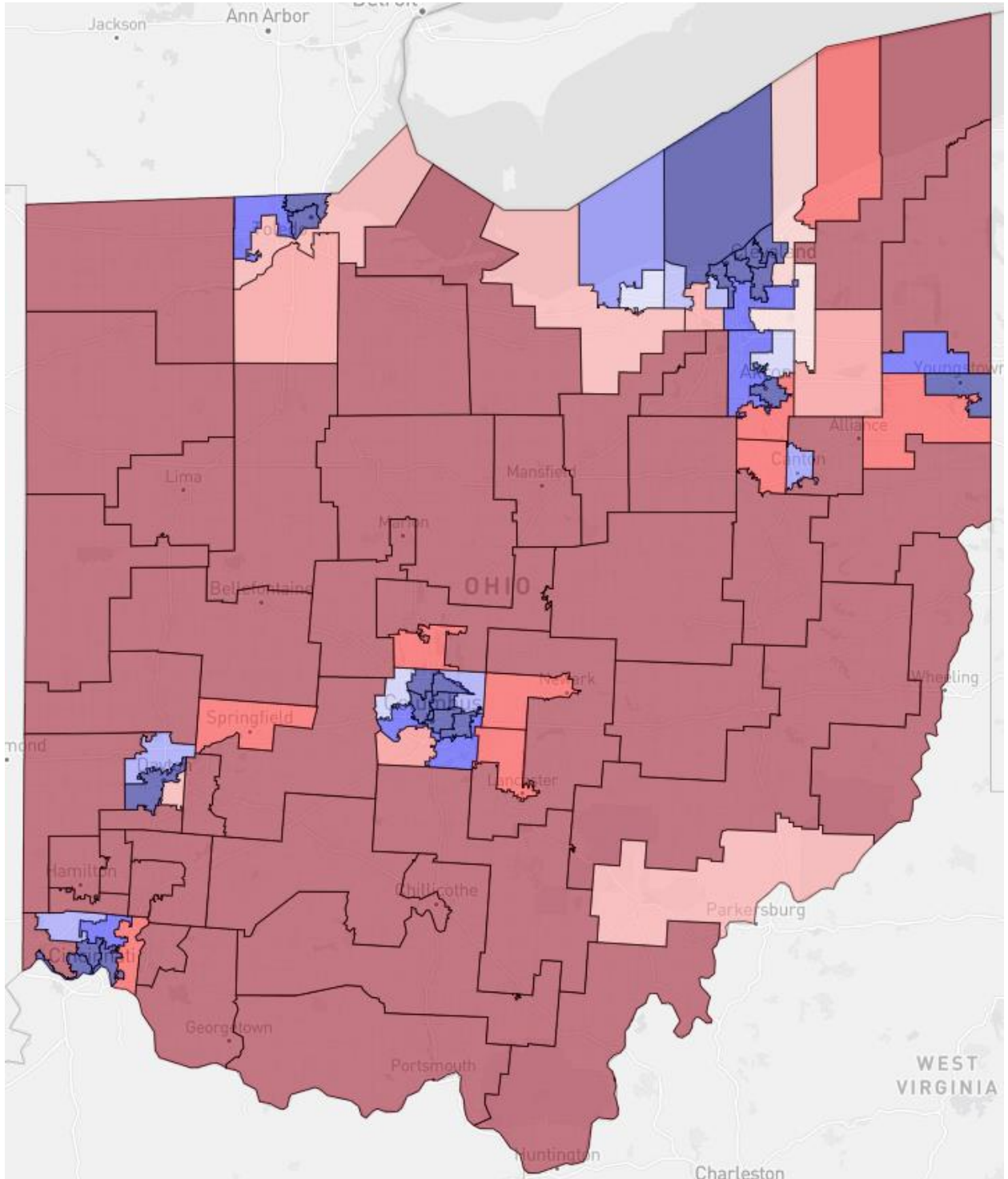
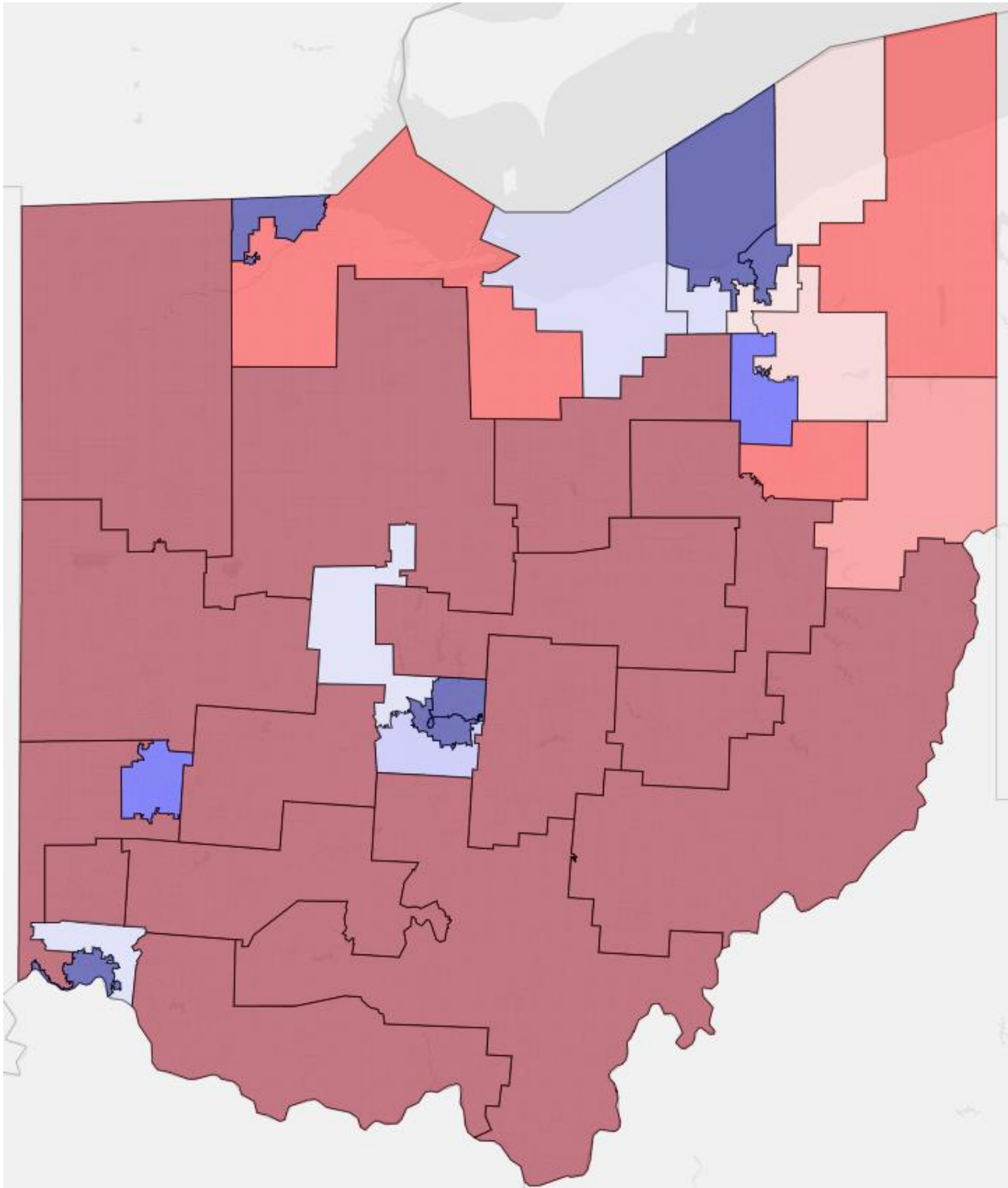


Modified House District Map



Modified Senate District Map



Contents

Election Data to Use	4
Proportionality	5
Compactness	6
Incumbents	7
County Splits	8
Township/Municipal Corporation Splits.....	10
Regional Changes	13
Franklin County	13
Cuyahoga/Lake Counties.....	14
Hamilton County	16
Summit County	17
Montgomery County.....	18
Lucas/Wood/Ottawa Counties	19
Butler County	20
Stark County.....	21
Lorain/Erie/Huron Counties	22
Mahoning County.....	23
Delaware County.....	24
Trumbull County.....	25
Portage/Geauga County.....	26
Ashtabula County.....	27
Southern/Southeast Ohio	28
Renumbering.....	29
Included Files	31

Co-chairs Leader Antonio and Auditor Faber and members of the Ohio Redistricting Commission, thank you for allowing me the opportunity to testify on this important subject. My name is Andrew Green, and I have been a resident of Northeast Ohio for nearly my entire life. Much like Geoff Wise, a gentleman you heard from on Friday, I currently work in industry as an engineer and have a side hobby involving political science and redistricting in particular. In his testimony, Dr. Wise referenced the “Strach approach” to complying with Art. XI, Sec. 6 and the somewhat conflicting objectives of Art. XI, Sec. 6(A) and Art. XI, Sec. 6(B). This approach requires beginning from what Dr. Wise called a “neutral draw.” For the purpose of my demonstration and in the spirit of deferring to the commission's judgment, I will assume that the September 20 McColley/LaRe map is a neutrally drawn map despite the fact that Dr. Wise acknowledged that it is not. Using this map as a starting point, I sought to move closer to proportionality. In the process, I also managed to reduce the number of districts that split townships or municipal corporations, including eliminating two such splits within a single district that renders that district in violation of Art. XI, Sec. 3(D)(3) of the Ohio Constitution.

The modified McColley/LaRe map that I created can be viewed using the included block assignment files or online at the links below:

- House Map: <https://davesredistricting.org/join/8b3ceb4f-a2b2-4ed7-a94d-d5e0bba21ad3>
- Senate Map: <https://davesredistricting.org/join/dc09a221-447c-47c6-adf4-8886f36df7c6>

Election Data to Use

Over the past week, the commission has discussed which “look-back” period it should use in evaluating maps and which “proportionality target” it should be aiming for as it finally attempts to comply with Art. XI, Sec. 6(B) of the Ohio Constitution.

In my opinion, it matters little which elections are used so long as the chosen proportionality target matches the elections that are used. This is consistent with the commission’s past practice. Namely, through its work in 2021 and 2022, the commission used only data from 2016-2020 despite the constitutionally required 10-year look-back because spatial data was not available for 2012 or 2014. It just so happened that the 2016-2020 average was almost identical to the 2012-2020 average, so the “proportionality target” did not change with the fact that the commission used 2016-2020 data rather than 2012-2020 data. Now that the 2022 elections are behind us, the commission must determine whether to include 2022 data with the 2016-2020 data. To me, there are two correct answers:

- Use 2016-2022 data and a proportionality target of 56% R-44% D
- Use 2016-2020 data and a proportionality target of 54% R-46% D

If a given map roughly matches one of the standards, it is very likely to match the other and should matter very little which is used.

Proportionality

While the modified map does not quite achieve the proportional target in Art. XI, Sec. 6 of the Ohio Constitution, it does get closer, especially in the Senate map. Additionally, in the spirit of the ballot language that Ohioans overwhelmingly approved on November 3, 2015, the modified map better satisfies “the goal of having district boundaries that are more... politically competitive¹” by ensuring a *balance* of districts that fall on either side of the perfectly competitive 50%-D/50%-R line rather than the asymmetrical distribution with which the Ohio Supreme Court found issue and the McColley/LaRe map continues to exhibit, despite still not hitting the Art. XI, Sec. 6(B) proportionality target that some maps approved by this commission have purported to achieve. The tables below shows how the partisan breakdown of the districts in modified House and Senate map compared to those of the McColley/LaRe map.

Partisan Category (HDs)	Modified Map	McColley/LaRe Map
Democratic (>50%-D)	37	37
Republican (>50%-R)	62	62
Competitive (47.5-52.5%)	4	7
Competitive D (50-52.5%-D)	2	5
Competitive R (50-52.5%-R)	2	2

Partisan Category (SDs)	Modified Map	McColley/LaRe Map
Democratic (>50%-D)	13	10
Republican (>50%-R)	20	23
Competitive (48-52.5%)	6	1
Competitive D (50-52.5%-D)	4	1
Competitive R (50-52.5%-R)	2	0

In all, the changes made in the modified map drive the likely results of the map closer to proportionality. Here is a simple (and perhaps a bit over-simplified) analysis of how the modified map better meets the Art. XI, Sec. 6(B) proportionality requirement than the McColley/LaRe map: assuming any of the above identified competitive districts could realistically be won by either party while all other districts will be won by the party that holds an advantage in that district, the range of possibilities moves as shown, generally increasing the number of expected Democratic seats in both the best- and worst-case scenarios for Democrats:

- House: between 60R-39D and 67R-32D to between 60R-39D and 64R-35D
- Senate: between 23R-10D and 24R-9D to between 18R-15D and 24R-9D

It is noteworthy that while this modified map is substantially more compliant with Art. XI, Sec. 6(B) of the Ohio Constitution than is the McColley/LaRe map, it still falls a fair bit short of this mark. I think the commission can and should continue to work with it to get closer.

¹ See: November 3, 2015 Issue 1 ballot language: <https://www.ohiosos.gov/globalassets/ballotboard/2015/1-language.pdf>

Compactness

With respect to geographic districts, compactness is relative. Nonetheless, it is a requirement of General Assembly districts, as laid out in Art. XI, Sec. 6(C) of the Ohio Constitution. That said, the modified map is slightly more compact than the McColley/LaRe map in terms of the map’s average Reock and Polsby-Popper compactness scores, measurements with which I believe all members of this commission are at least vaguely familiar. It is also worth noting that I would have been able to draw several districts to be even more compact had I not made the decision to consider the residences of non-term-limited incumbents, something that, unlike compactness, is not a constitutional requirement.

The table below depicts the average Reock and Polsby-Popper scores for each map previously adopted by the commission (with the exception of the 4th map, which was substantively the same as the 2/22 map), the McColley/LaRe map, the modified map, and a few other maps that have been proposed by other members of the commission, its consultants, or outside parties. While the McColley/LaRe map falls in the upper range of these maps, it still scores below the modified map on both measurements, both in the House map and the Senate map.

	9/21 Adopted Plan	1/22 Adopted Plan	2/22 Adopted Plan	Sykes/Russo 2/22 Plan	Rodden III Plan	Indy Mappers Plan	9/20 McColley LaRe Plan	Modified Plan
House Plan								
Reock	0.3766	0.3803	0.3791	0.3706	0.4013	0.3864	0.3887	0.3889
Polsby-Popper	0.2952	0.2984	0.3057	0.299	0.3478	0.3207	0.3192	0.3199
Senate Plan								
Reock	0.3724	0.3861	0.3831	0.402	0.4227	0.4158	0.3946	0.3995
Polsby-Popper	0.3081	0.2983	0.2765	0.3211	0.3678	0.3346	0.3011	0.3284

Incumbents

In accordance with the comments made during the commission's September 20th meeting by Senator McColley with respect to the consideration of incumbents² and without endorsing this extra constitutional objective that this commission seems to have unanimously adopted, I have created this modified map without double bunking any non-term-limited incumbent members of either chamber in a district belonging to that chamber. This was done using publicly accessible voter registration data for each non-term-limited incumbent member. Additionally, any senator that will be in the middle of their term during the 2024 election (thus entitled to the assignment of a new district pursuant to Art. XI, Sec. 5 of the Ohio Constitution) and will be eligible to run for reelection in 2026 is a resident of the proposed modified district to which they are assigned to pursuant to Art. XI, Sec. 5.

² See: <https://www.ohiochannel.org/video/ohio-redistricting-commission-9-20-2023?start=2153&end=2182>

County Splits

The number of county that are split³ in each map is comparable between the two House maps, with 39 in the McColley/LaRe map and 40 in the modified map. The table below shows which counties are split in which map(s).

County	Split in McColley/LaRe Map?	Split in Modified Map?
Ashtabula*	Yes	Yes
Athens	Yes	Yes
Auglaize	Yes	Yes
Belmont	Yes	Yes
Brown*	Yes	Yes
Butler*	Yes	Yes
Clark*	Yes	Yes
Clermont*	Yes	Yes
Columbiana	Yes	Yes
Cuyahoga*	Yes	Yes
Darke	Yes	Yes
Defiance	Yes	Yes
Delaware*	Yes	Yes
Erie	No	Yes
Fairfield	Yes	Yes
Franklin	Yes	No
Geauga*	Yes	Yes
Greene	Yes	Yes
Guernsey	Yes	Yes
Huron	Yes	No
Hocking	No	Yes
Jackson	No	Yes
Knox	Yes	Yes
Lake*	Yes	Yes
Licking*	Yes	Yes
Logan	Yes	Yes
Lorain*	Yes	Yes
Lucas*	Yes	Yes
Mahoning	Yes	Yes
Marion	Yes	Yes
Medina*	Yes	Yes
Montgomery*	Yes	Yes
Ottawa	Yes	Yes
Perry	Yes	Yes
Portage*	Yes	Yes

³ For the purposes of this section, a county is considered split if it has a district that crosses the boundary of that county into another county. Any county denoted with an asterisk (*) indicates that a given county must be split in order ensure roughly equal populations across all districts and to comply with Art. XI, Sec. 4 of the Ohio Constitution. This amounts to 18 counties in a House map and 8 counties in a Senate map.

Ross	Yes	Yes
Stark	Yes	Yes
Summit*	Yes	Yes
Trumbull*	Yes	Yes
Wood*	Yes	Yes

Below is a summary of the counties that are split in the two Senate maps. The number of counties split in the modified map (18) is slightly greater in than in the McColley/LaRe map (14). However, there is no constitutional requirements on limiting the number of counties split in a Senate map beyond the Art. XI, Sec. 4(B)(2) requirement not to split certain counties, so limiting these splits were not prioritized relative to limiting the splits of townships and municipal corporations between House districts.

County	Split in McColley/LaRe Map?	Split in Modified Map?
Athens	No	Yes
Auglaize	No	Yes
Butler*	Yes	Yes
Cuyahoga*	Yes	Yes
Darke	Yes	No
Erie	No	Yes
Franklin*	Yes	Yes
Geauga*	Yes	Yes
Guernsey	Yes	Yes
Hamilton*	Yes	Yes
Hocking	No	Yes
Huron	Yes	No
Logan	Yes	Yes
Lucas*	Yes	Yes
Marion	No	Yes
Montgomery*	Yes	Yes
Perry	Yes	Yes
Ross	No	Yes
Stark	Yes	Yes
Summit*	Yes	Yes

Township/Municipal Corporation Splits

Art. XI, Sec. 3(D)(3) states that splits of townships and municipalities are only permissible “[w]here the requirements of [approximately equal population, the Ohio Constitution, federal law, and contiguity] cannot be feasibly obtained by forming a representative district from whole municipal corporations and townships.” In my reading of this requirement, such splits must be minimized to the extent practicable. In the September 20, 2023 meeting of the Ohio Redistricting Commission, Senator McColley asserted that there were one municipality and five townships split in the McColley/LaRe House map (beyond those that are “permissive” because a municipality has a population greater than that of a House district)⁴. However, I have found that the proper count is two municipalities and five townships. This additional municipal split, while having a trivial resolution, is a critical defect of the McColley/LaRe map because one of the two districts that split it also splits a township. Namely, HD-29 splits both the village of Cleves and Springfield Township, putting it in objective violation of Art. XI, Sec. 3(D)(3), which provides that “not more than one municipal corporation or township may be split per representative district.” This can easily be remedied by moving the entirety of Cleves into HD-30, which requires moving zero people.

Additionally, I find Senator McColley’s depiction of what he calls “permissive” splits to be a bit oversimplified. Surely, Columbus and Cleveland cannot simply be placed in a single House district and, therefore, must be split. While there are cities that must be split, they need not be (and should not be) split ad nauseam, something that Senator McColley even referenced in his comments about splits cited above. I have found that a useful way to look at the extent to which the splits of these large cities is excessive is to look both at the total number of districts that contain a portion of a given city and the number of districts fully contained within the city⁵.

The modified map reduces the number of township/municipal splits from the McColley/LaRe map when looked at from any of the perspectives discussed above. In particular, using the methodology that Senator McColley used to arrive at one (but, as mentioned above, actually two) municipal corporation and five township splits, the modified plan splits just one municipal corporation and two townships.

⁴ See: <https://www.ohiochannel.org/video/ohio-redistricting-commission-9-20-2023?start=2181&end=2255>

⁵ For the purposes of determining whether a district is fully contained within a city, especially one with complex boundaries (such as Columbus), I find it helpful to employ something not directly applicable to drawing General Assembly districts but rather congressional districts. Namely, Article XIX, Sec. 2(B)(4)(a) of the Ohio Constitution: “[I]f the territory of [a] municipal corporation or township completely surrounds the territory of another municipal corporation or township, the territory of the surrounded municipal corporation or township shall be considered part of the territory of the surrounding municipal corporation or township.” For example, for the purposes of evaluating whether a district is fully contained within Columbus, I would consider any enclave of Columbus (Bexley, for example) to be part of Columbus.

Below is a table summarizing the number of districts each municipality or township is split into in each of the two maps. The theoretical minimum number of districts with a split township or municipal corporation for a given House map is approximately 24⁶. This is the sum of the minimum number of districts with “permissive” splits that Senator McColley described with respect to the state’s large cities. However, the McColley/LaRe map has 45 such districts, compared to just 36 in the modified map. The highlighted townships/municipal corporations below are presumably the six to which Senator McColley referred in his above referenced comments regarding the splits in the McColley/LaRe map.

Municipal Corporation/Township	Split Between __ Districts in McColley/LaRe Map	Split Between __ Districts in Modified Map
Columbus (min. ~11)	12	11
Cleveland (min. 3)	8	8
Mentor	2	2
Cincinnati (min. 3)	3	3
Cleves	2	N/A
Springfield Twp. (Hamilton Co.)	2	N/A
Akron (min. 2)	3	2
Dayton (min. 2)	2	3
Toledo (min. 3)	3	3
Perrysburg Twp. (Wood Co.)	2	2
Jackson Twp. (Stark Co.)	2	N/A
Plain Twp. (Stark Co.)	N/A	2
Athens Twp. (Athens. Co.)	2	N/A
Harpersfield Twp. (Ashtabula Co.)	2	N/A
TOTAL DISTRICTS WITH SPLITS	45	36

As discussed above, another way to look at splits of the state’s large cities is to look at the number of districts fully contained within any such city. The table below shows the number of districts fully contained within a given city for each map. The maximum number of such districts in a given House map is 19⁷. However, the McColley/LaRe map has just four such districts while the modified map has nine.

⁶ Note: This theoretical minimum is calculated simply based on the populations of cities in excess of one House district. The geography in parts of the state likely require some other splits to be made. Additionally, I have assumed that Columbus must be split by every district fully contained within Franklin County simply because of its very complex boundaries that span most of the county.

⁷ I think it is important to note that achieving 9 districts each contained entirely within the city of Columbus and its enclaves is incredibly unfeasible due to the complex municipal boundaries in the area and the restrictions that it would pose on constructing the remainder of the map. This is simply an illustration of what is mathematically possible.

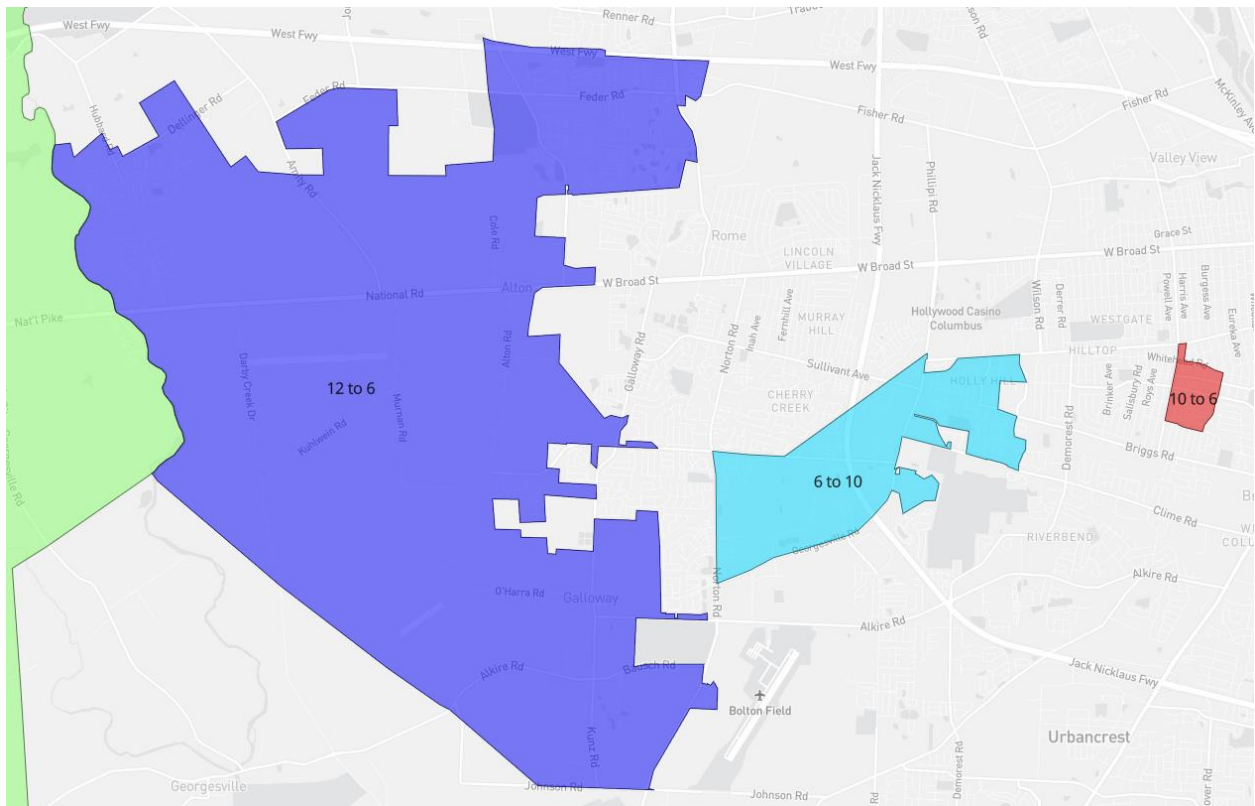
City	Districts fully contained within in McColley/LaRe Map	Districts fully contained within Modified Map
Columbus (max. 9)	3	3
Cleveland (max. 3)	0	1
Cincinnati (max. 3)	0	2
Akron (max. 1)	0	1
Dayton (max. 1)	0	0
Toledo (max. 2)	1	2
TOTAL DISTRICTS FULLY CONTAINED	4	9

Regional Changes

This section will detail the changes made to the Sept 20 McColley-LaRe map in order to create a modified map, which comes closer to constitutional compliance with respect to Art. XI, Sec. 6(B) of the Ohio Constitution. Changes were made primarily to drive the map closer to Section 6(B) compliance, but, as detailed below, some changes were made for other constitutional considerations (limiting township/municipality splits, compactness, etc.).

Franklin County

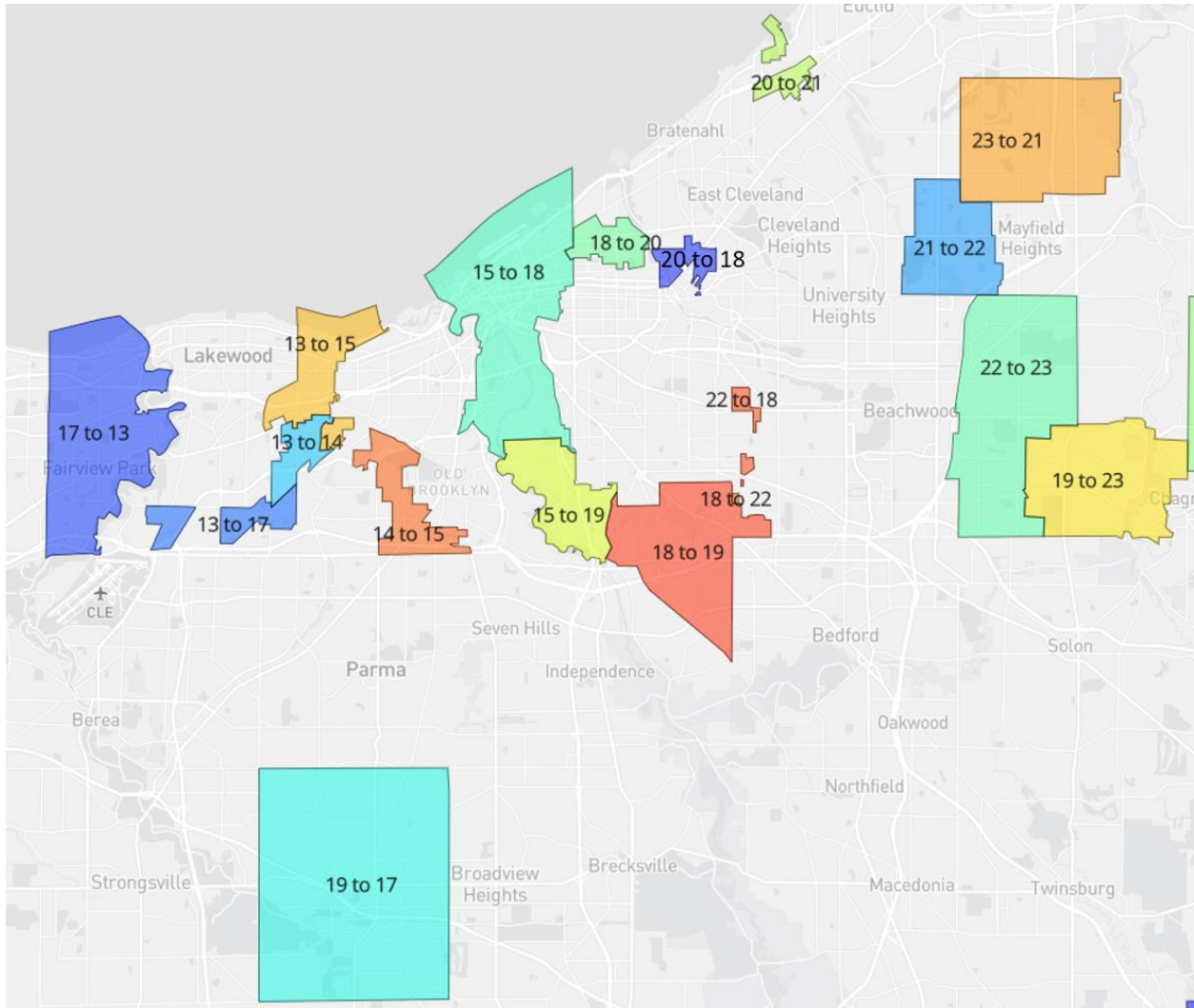
In order to accommodate the adjusted House to Senate district pairings in Hamilton County, it was necessary to remove HD-12 from Franklin County, as it would no longer be able to pair with Franklin County. The easiest way to do this without having even more cascading effects was to absorb the Franklin County portion of district 12 into other Franklin County districts. Very little had to be changed. See below for the precincts that were moved between districts (27,975 people in all).



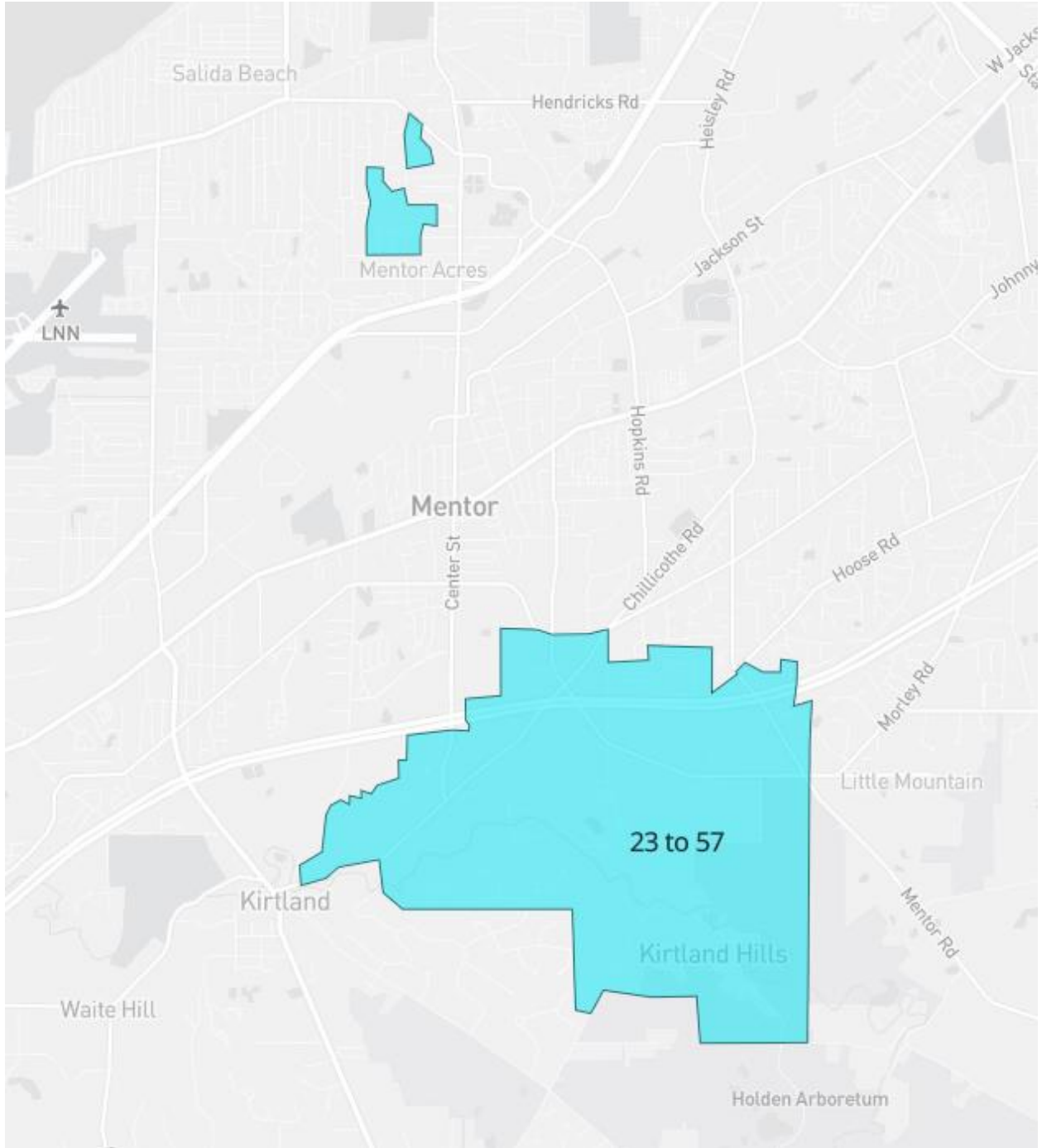
Additionally, the House to Senate district pairings in Franklin County were adjusted to make a more competitive SD-3.

Cuyahoga/Lake Counties

Changes in Cuyahoga County were done primarily for two reasons: make each HD-23 (HD-22 in the modified map) and SD-12 more competitive. Because of the very tight population constraints with the commission's chosen Cuyahoga/Lake County pairing, these changes had cascading effects across nearly all of Cuyahoga County.



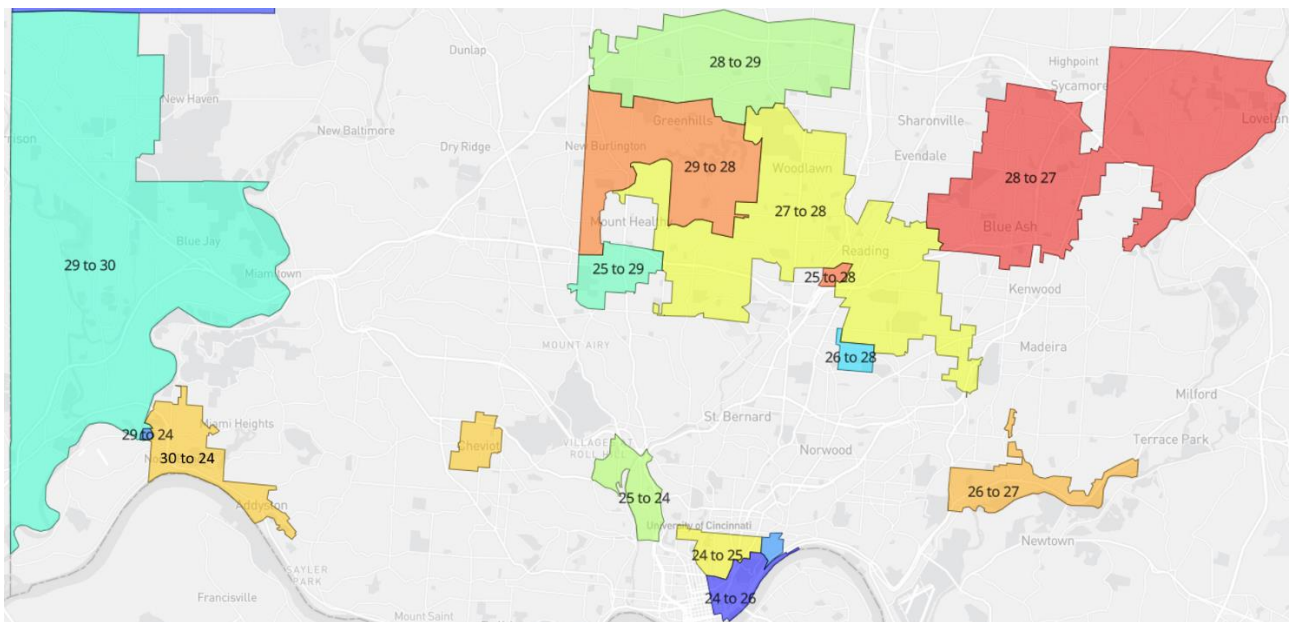
A few small adjustments were also made between the two Lake County House districts to keep all districts below the 105% of ideal population limit.



Hamilton County

The primary purpose of reconfiguring Hamilton County was to create a more competitive SD-8 while keeping Cincinnati entirely contained within SD-9. This required changing the House to Senate district pairings, putting Hamilton County's seventh House district with House districts that span Butler, Preble, and Montgomery counties instead of pairing it with Warren County. This change had some cascading effects across southern and southwest Ohio due to Art. XI, Sec. 4 limitations on which other House districts could be paired to create Senate districts.

Additionally, some otherwise "unnecessary" changes were made to eliminate all township/municipal splits⁸ in Hamilton County (except for two within the city of Cincinnati, which must be split at least twice—between three districts—in order to ensure roughly equal populations in each district).

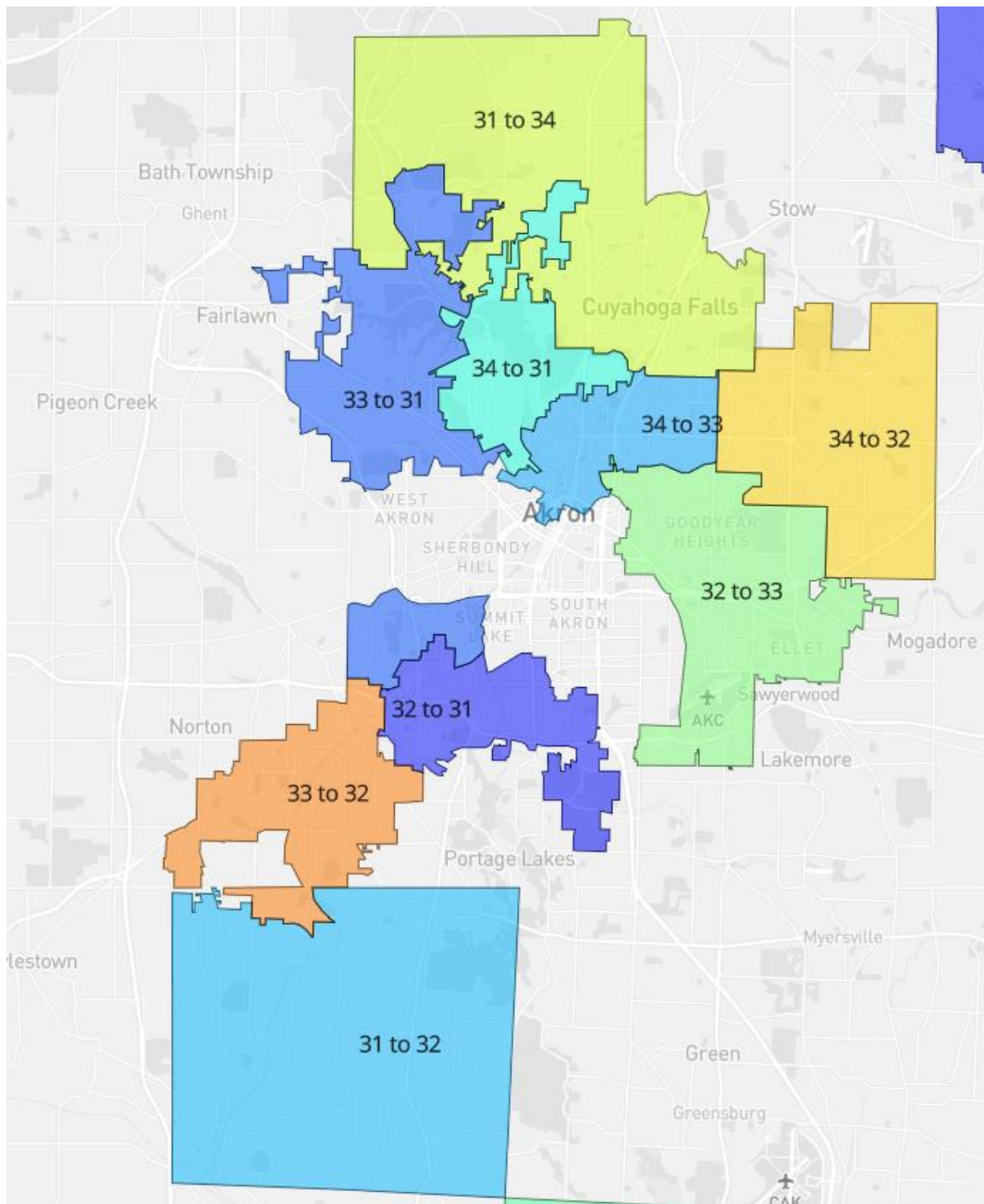


⁸ Split as defined in Art. XI, Sec. 3 ("a county, municipal corporation, or township is considered to be split if any contiguous portion of its territory is not contained entirely within one district).

Summit County

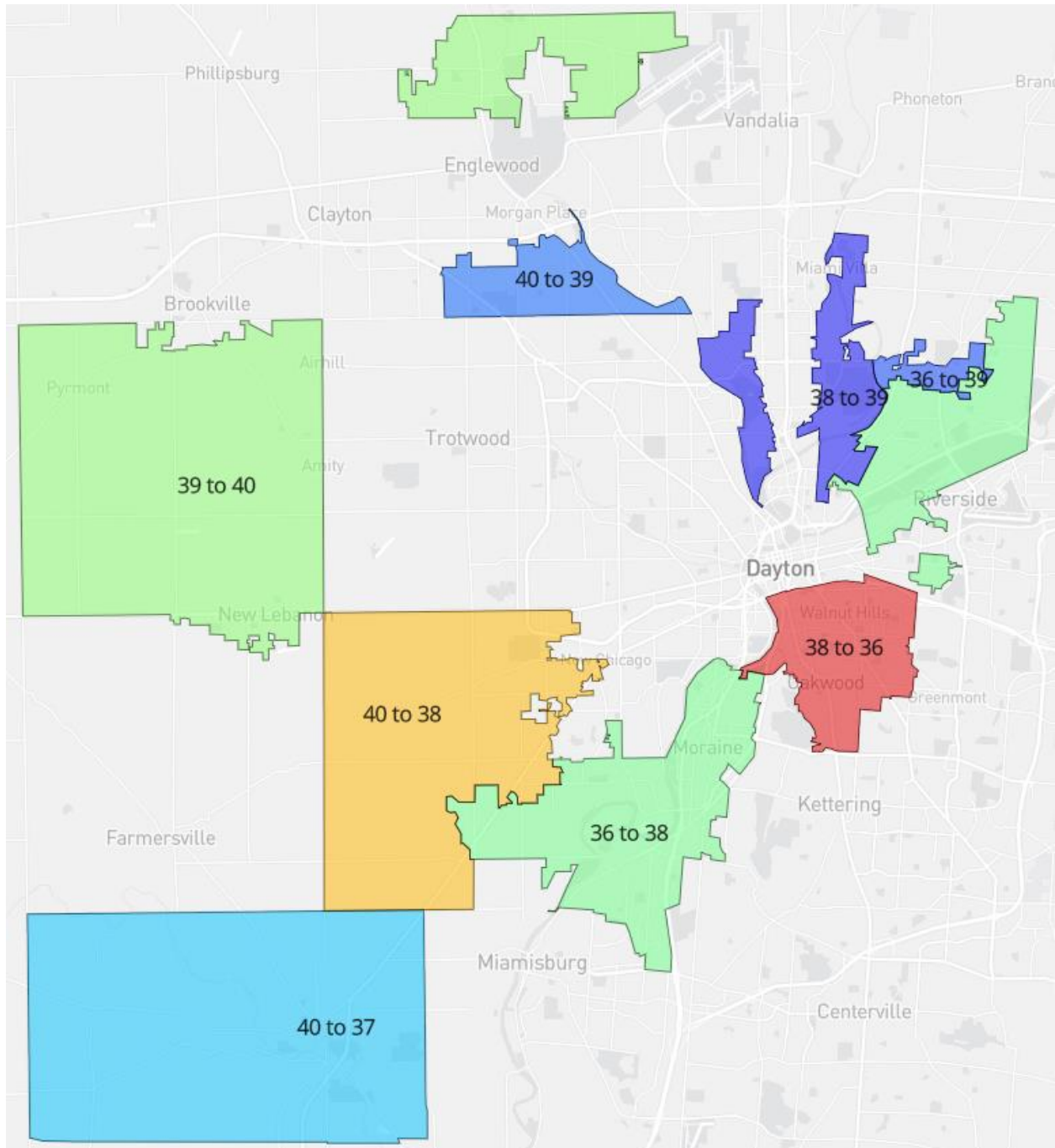
Summit County was reconfigured in order to help bring the overall map closer to the proportional target contemplated in Art. XI, Sec. 6(B). Namely, HD-31 becomes a Democratic-leaning district while the Summit-Portage-Geauga County Senate district (the numbers of the two Summit County Senate districts were required to be flipped pursuant to Art. XI, Sec. 5) becomes more competitive.

Additionally, one municipal split is eliminated from the McColley-LaRe House map. In the modified map, the city of Akron is split just once between two districts (the minimum number possible to accommodate population equality).



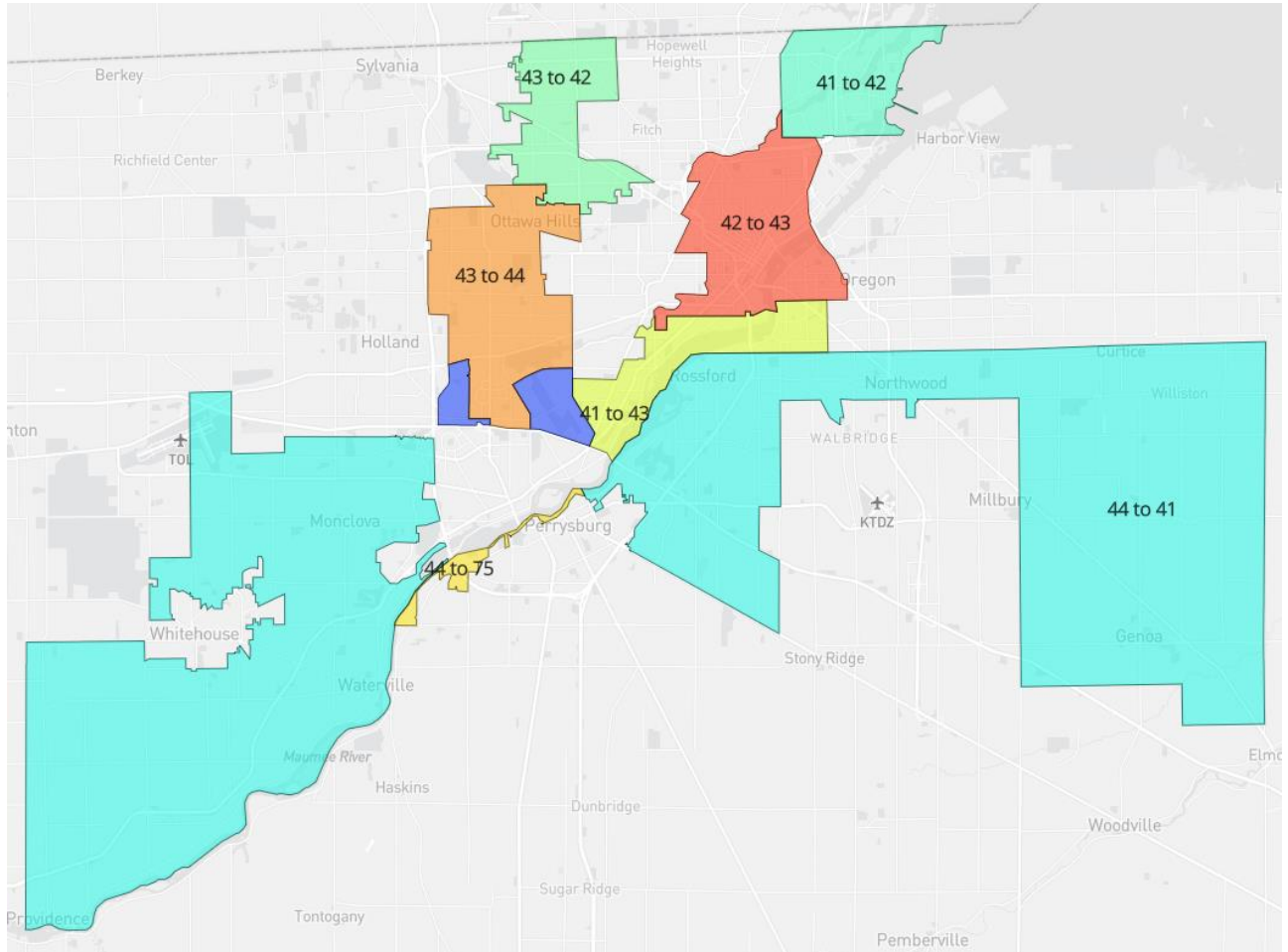
Montgomery County

Changes in Montgomery County were made primarily to create a more competitive HD-36 and make HD-39 and the Dayton-based Senate district more Democratic-leaning to bring the overall map closer to the Art. XI, Sec. 6(B) proportionality target. In so doing, an extra split of the city of Dayton is introduced from the McColley-LaRe map. However, the modified map does still keep Dayton fully contained in just one Senate district.



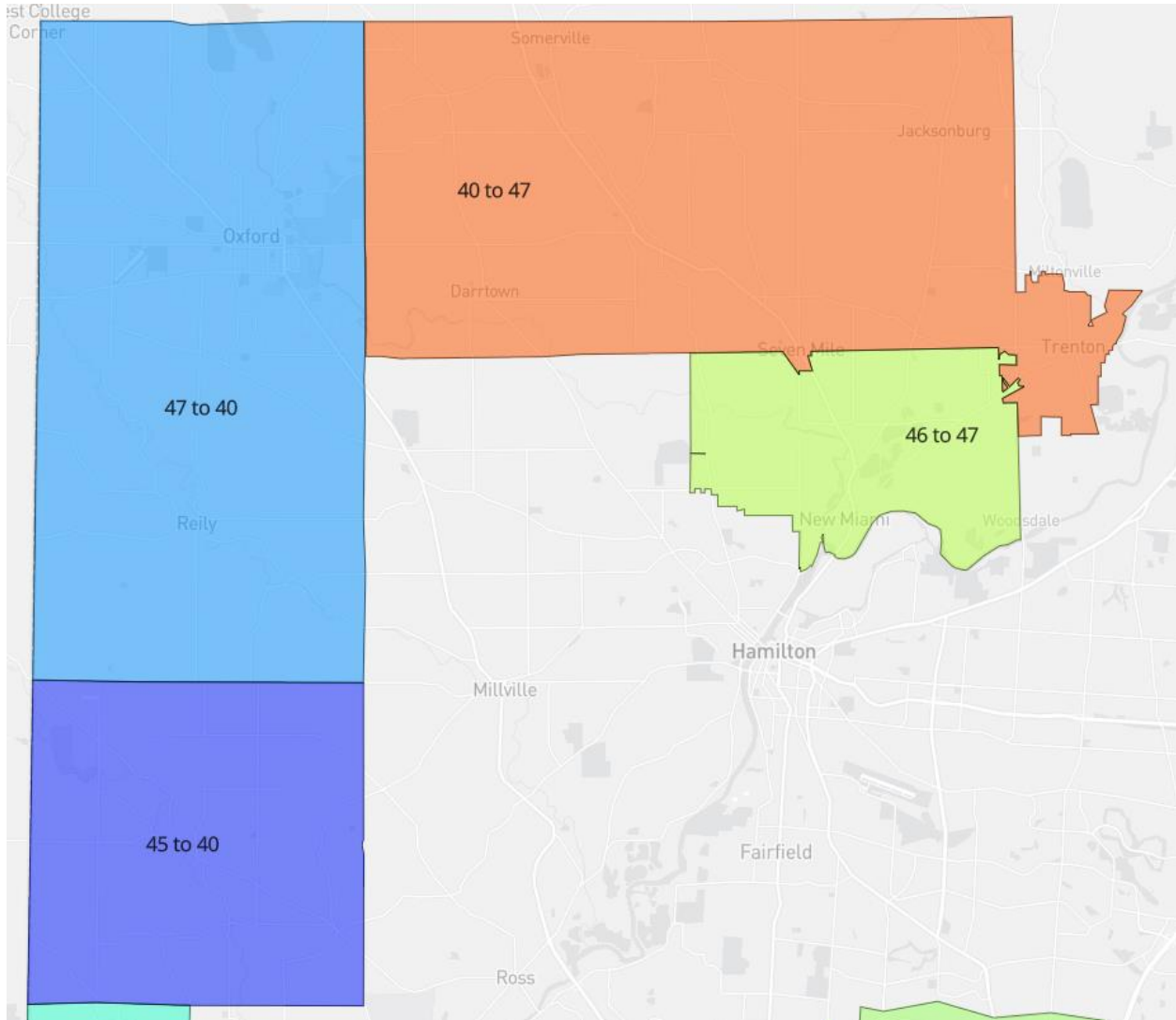
Lucas/Wood/Ottawa Counties

The main goal of making changes to this region was to eliminate the borderline discontinuity in HD-44 as it follows the Maumee River and traverses across Maumee Bay. The modified map also creates two House districts fully contained in the city of Toledo (compared to just one in the McColley-LaRe map). Likewise, it maintains the feature of the McColley-LaRe map that Toledo is contained entirely in SD-11.



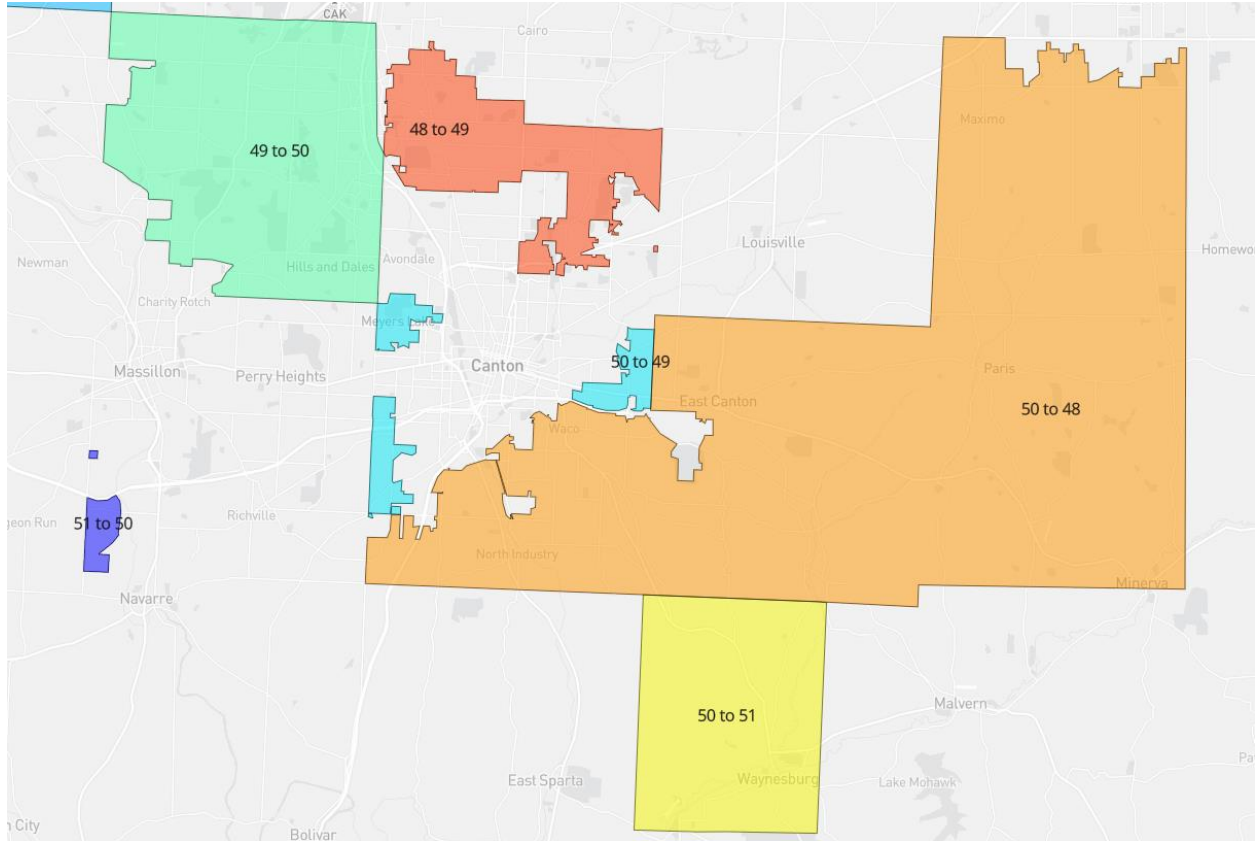
Butler County

Small changes were made in Butler County to accommodate the adjusted House to Senate district pairings in Hamilton County. This has no meaningful impact on the partisanship of any of the Butler County House or Senate districts.



Stark County

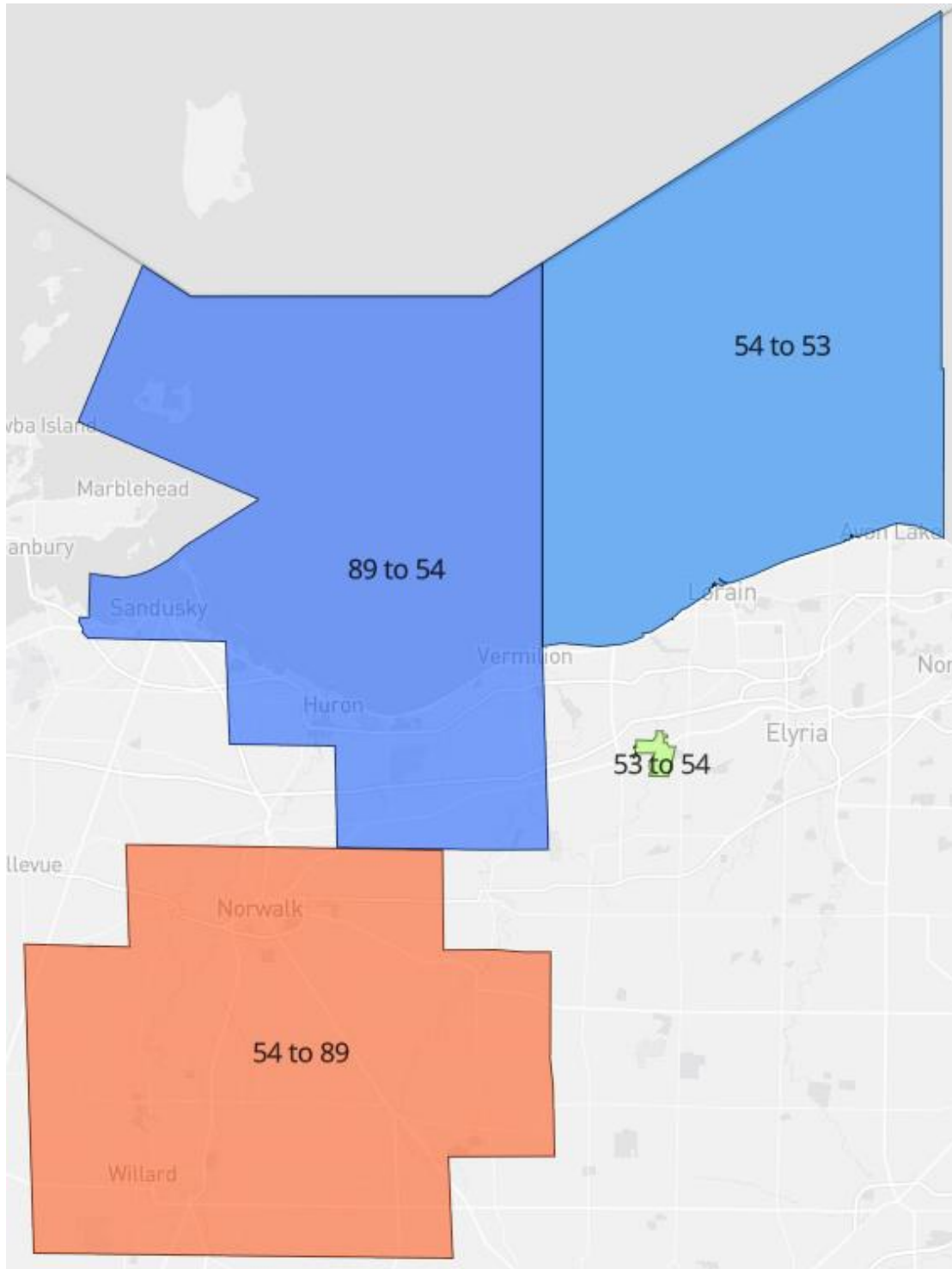
Changes were made in Stark County primarily to improve compactness. In doing so, HD-49 became more Democratic-leaning, to bring the overall map closer to the proportionality target in Art. XI, Sec. 6(B).



Lorain/Erie/Huron Counties

Changes were made in this region primarily to create a more competitive SD-13. Namely, the Huron County portion of HD-54 was moved to HD-89 and a portion of Erie County was moved to HD-54.

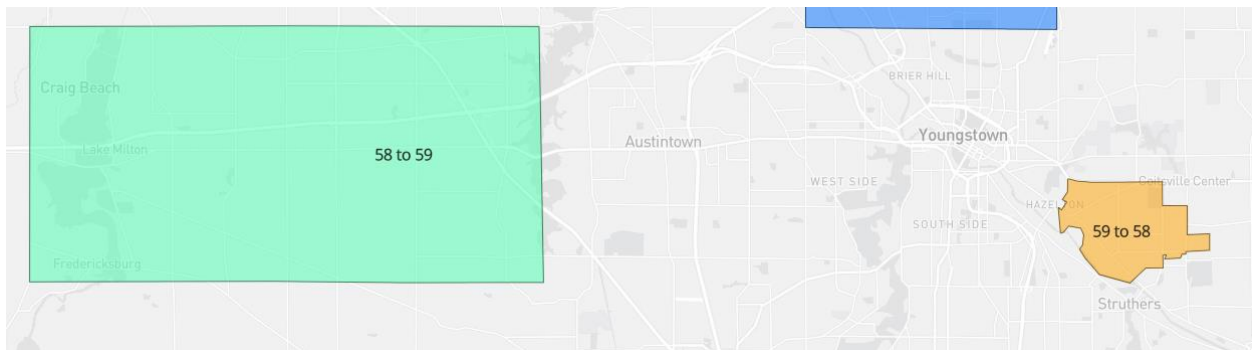
Additionally, the village of South Amherst was moved from HD-53 to HD-54 to better balance populations between the three Lorain County House districts



Mahoning County

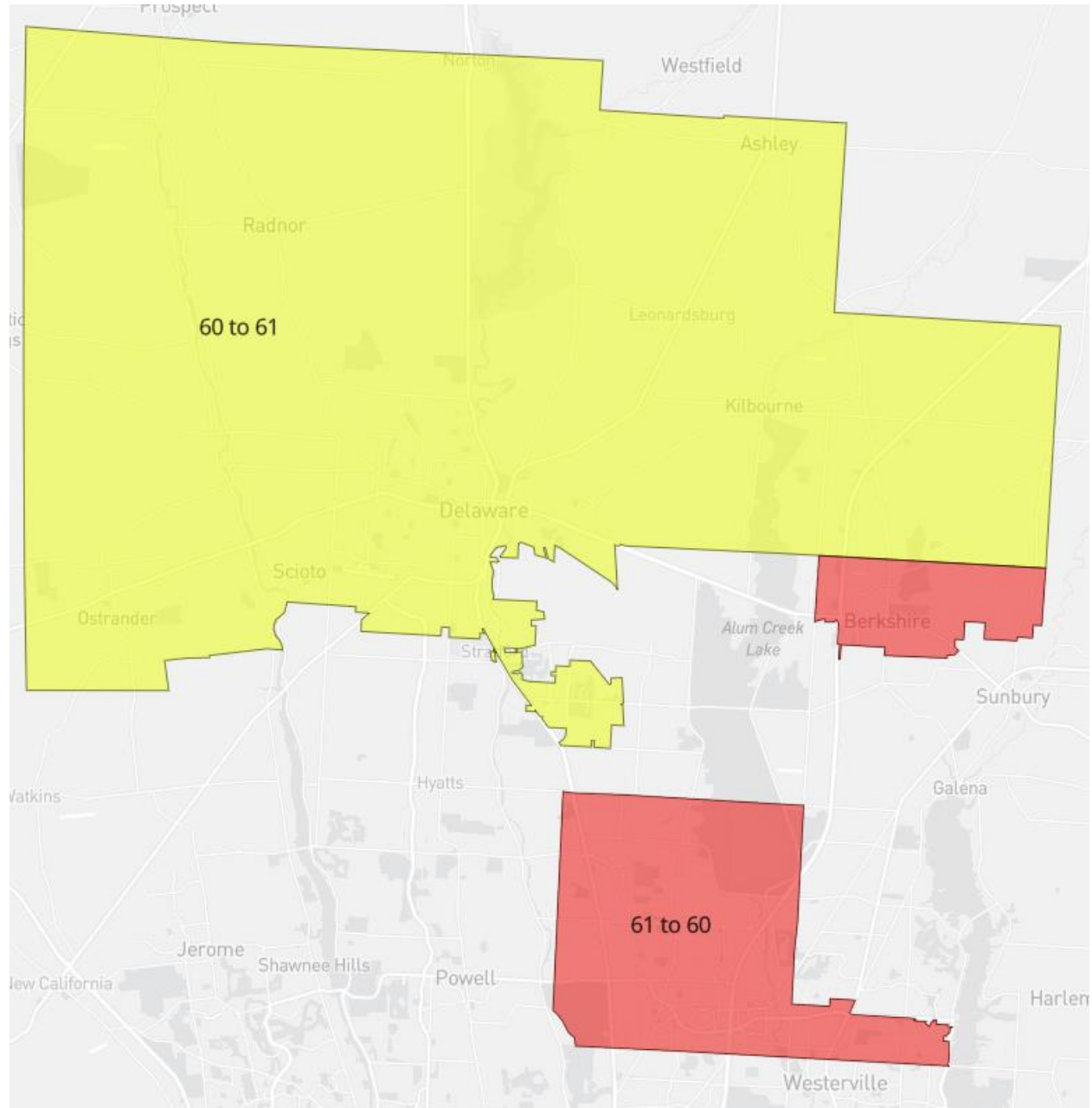
The two Mahoning County districts are significantly different, with HD-59 being mostly rural and HD-58 being much more urban and suburban. In order to better maintain this distinction, Craig Beach, and Jackson and Milton Townships were moved from HD-58 to HD-59 while Campbell was moved from HD-59 to HD-58.

Having grown up in this area, I feel it appropriate to point out that I think even the modified map could be further improved by putting Struthers in HD-58 and Poland (village and township) in HD-59. I did not do make this change in order to, as I have previously mentioned, give as much deference to the commission as possible.



Delaware County

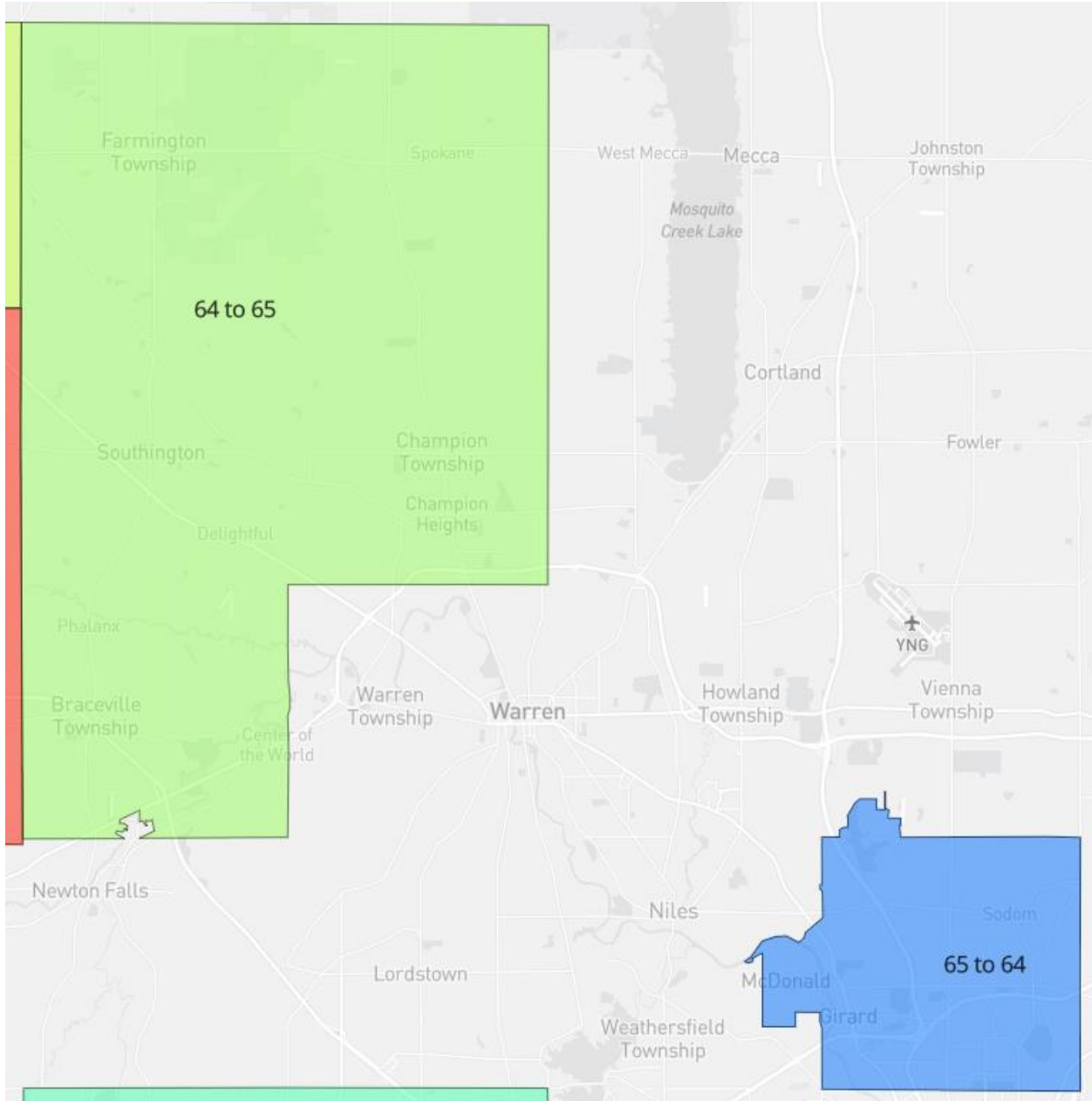
Changes in Delaware County were made to make HD-60 more competitive. I feel it worthy of note that a considerably more compact and even more competitive HD-60 is entirely possible in southern Delaware County, and although such a district would have been my preference, I chose not to draw it in my modified map in order to respect the wish of commissioners that non-term-limited members of the General Assembly not be drawn into the same district.



Trumbull County

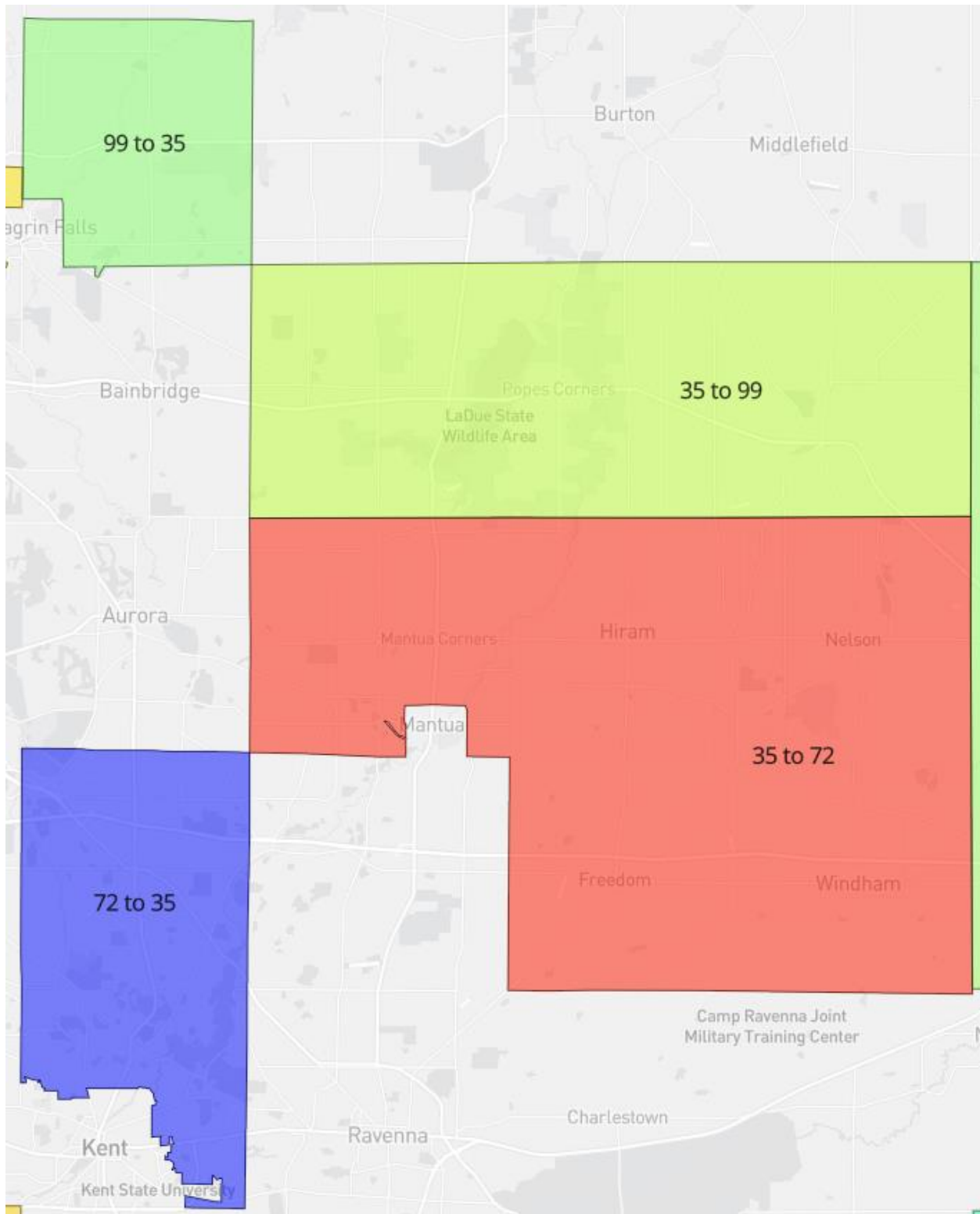
Changes between HD-64 and HD-65 were made to create a more Democratic-leaning HD-64 in order to bring the map closer to the statewide proportionality target in Art. XI, Sec. 6(B).

Similar to the changes made in Mahoning County, the modified map better maintains a distinction between the county's urban/suburban district and its rural district.



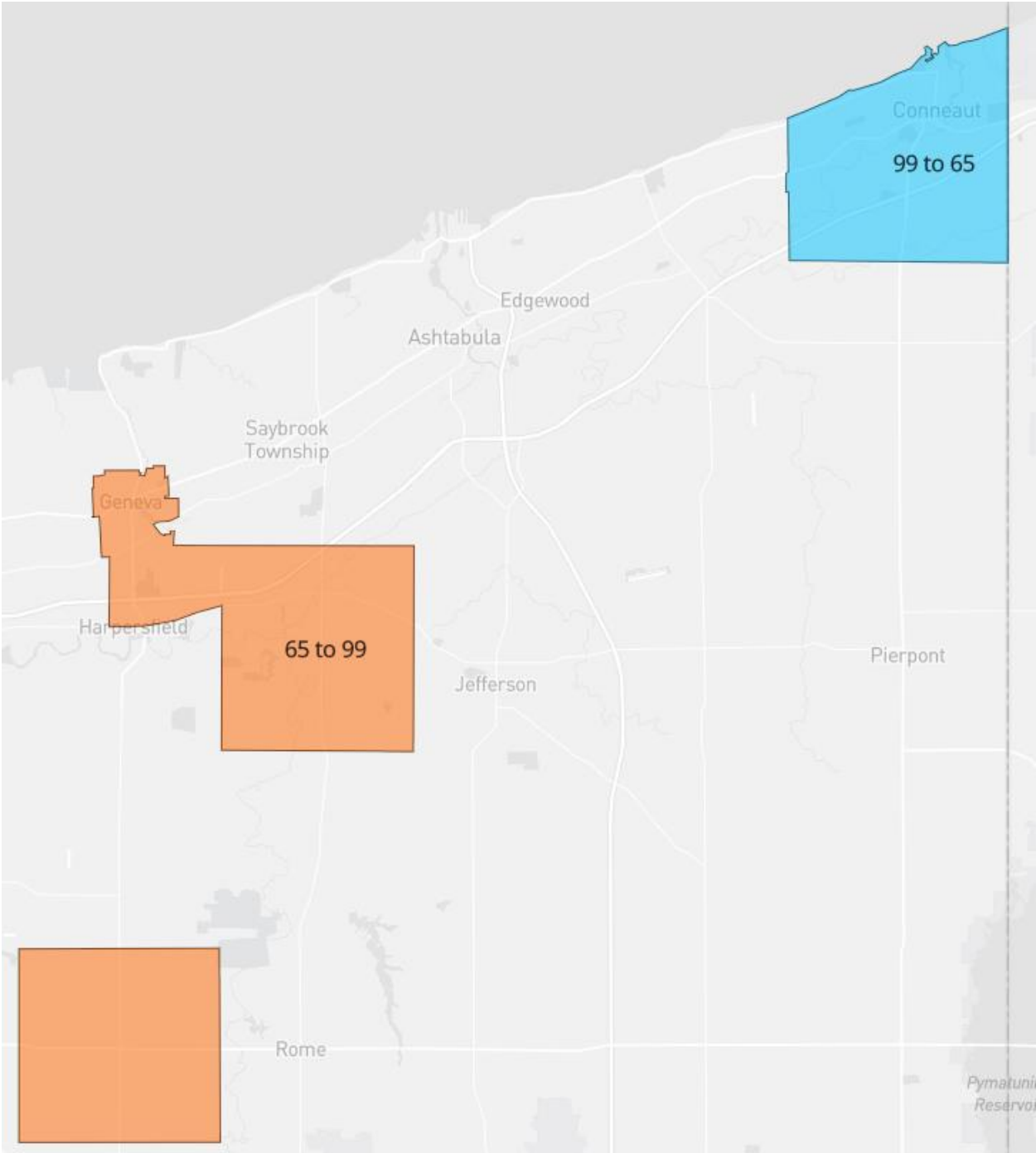
Portage/Geauga County

In order to make HD-35 more competitive, some territory was swapped between HD-35 and HD-99 in Geauga County and between HD-35 and HD-72 in Portage County.



Ashtabula County

Some territory was swapped between HD-65 and HD-99 in order to eliminate the split of Harpersfield Township.



Renumbering

When creating the modified map, the choice was made to eliminate the twelfth/partial House district in Franklin County. Because of the requirements for numbering House districts pursuant to Art. XI, Sec. 3(C), there was a cascading effect that various districts across the state had to be renumbered. Throughout this document, for the purpose of simplifying the comparison of districts across the two maps, I have elected to use only the House district numbers in the McColley/LaRe map. For reference, the actual House district number in the modified map and the corresponding McColley/LaRe district number are depicted in the table below. Any districts not shown in the table maintained the same number in the modified map

Modified Map House District Number	McColley/LaRe Map House District Number
12	22
22	23
23	30
27	28
28	29
29	27
30	34
34	35
35	39
39	40
40	43
41	44
43	41
44	47
47	48
48	49
49	50
50	51
51	53
53	54
54	56
56	57
57	58
58	59
59	60
60	61
61	62
62	63
63	64
64	65
65	66

66	67
67	68
68	69
69	70
70	71
71	72
72	73
73	74
74	75
75	76
76	77
77	12
91	92
92	91

Included Files

- Sept 20 2023 McColley LaRe_modified.pdf
 - This document
- Copy of Sept 20 2023 McColley LaRe HSD Pair BAF_modified.xlsx
 - Document used to convert HD block assignment file to SD block assignment file by assigning certain House districts to a given Senate district.
- McColley LaRe_modified Comparison.xlsx
 - Contains pivot tables showing how many people were moved from each district in the McColley/LaRe map to create the modified map.
- Moved HD BAF.csv
 - Block assignment file containing all areas that were moved from one House district in the McColley/LaRe map to another House district in the modified map. This can be seen mapped out at <https://davesredistricting.org/join/4826498b-56cb-4242-97b0-18928e126f59>
- Copy of Sept 20 203 McColley LaRe HD BAF_modified.csv
 - Block assignment file containing the House districts in the modified map. This map can also be viewed online at <https://davesredistricting.org/join/8b3ceb4f-a2b2-4ed7-a94d-d5e0bba21ad3>
- Copy of Sept 20 203 McColley LaRe SD BAF_modified.csv
 - Block assignment file containing the Senate districts in the modified map. This map can also be viewed online at <https://davesredistricting.org/join/dc09a221-447c-47c6-adf4-8886f36df7c6>