Virginia's First Experiment in Non-Partisan Redistricting:

Analysis and Perspectives from a Professional Demographer

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Abstract

For the first time in Virginia's history, an independent bipartisan advisory commission was established to provide recommendations for redistricting Virginia's congressional and state legislative seats. Selected by Governor Bob McDonnell, commission members appointed myself, a professional demographer from the University of Virginia, to advise them on demographic trends and draw the new district maps. The following paper is an objective evaluation of the maps I drew for the commission, among others, against the final maps passed by the state legislature.

The paper was originally presented to Governor McDonnell on April 12, 2011 as an attempt to show statistics on each redistricting plan and convince the governor to veto the state legislature maps. He did so on April 15. However, the commission's non-partisan maps for state legislative districts were ultimately not used and the partisan maps drawn by the state legislature were recently approved by the U.S. Department of Justice.

Executive Summary

The impartial criteria and metrics used in this report unequivocally show that the House and Senate redistricting maps passed by the General Assembly in HB 5001 will make legislative districts less compact, split more counties and cities, and separate commonsense communities of interest even more than the maps currently in place. In short, the maps presented to the Governor by the General Assembly would make a bad situation worse for the coming decade.

The empirical analysis in this paper will show that the model maps from the Independent Bipartisan Advisory Commission on Redistricting and the winning maps from the Virginia College and University Redistricting Competition improve upon the current districts in dramatic ways without sacrificing equal population standards or voting rights considerations.
The maps passed by the General Assembly achieve a low population deviation among districts, but at a cost to other desirable characteristics, especially compactness and the integrity of existing city and county boundaries. Both of those characteristics were strongly endorsed by citizens in separate rounds of public hearings held around the state by the Advisory Commission and by the House and Senate Privileges and Elections Committees.

In general, by being less stringent on equal population but still within court-approved variances, district maps can be much more compact and conform better to county and city boundaries. For example, the General Assembly drew a map for the House of Delegates using a 1 percent limit on deviation from the ideal district population, but, as a result, *increased* the number of splits by 2 percent. By applying the 2 percent population deviation used by the General Assembly in 2001, the Advisory Commission's model map *reduced* the number of splits by 21 percent.
Even using identical population deviations, it is possible to adhere better to existing municipal boundaries than the maps sent to the Governor by the General Assembly. For example, using a 2 percent deviation from the ideal district population, the Senate map passed by the General Assembly *increased* the number of city and county boundary splits by 23 percent. Using that same population deviation, the Advisory Commission's model Senate map #1 *reduced* the number of county and city splits by 35 percent.

These examples and others in this paper support the conclusion that the General Assembly has failed to meet the redistricting standards articulated by Gov. McDonnell, namely respecting existing municipal boundaries and maintaining communities of interest, as expressed in his public statements and in Executive Order 31, which created the Advisory Commission. In sum, this paper provides an empirical basis according to which the Governor could exercise his Constitutional authority to amend and improve House Bill 5001, and return it to the General Assembly for further action.

A Historic Opportunity

For the first time in Virginia's history, an open, public process has presented the General Assembly and the Governor with a wide variety of viable alternatives for redistricting the House of Delegates and Virginia Senate seats, in addition to the plans devised by the House and Senate Privileges and Elections Committees.

First, the Independent Bipartisan Advisory Commission on Redistricting appointed by Governor McDonnell has gathered the input of citizens and organizations around the Commonwealth to create maps and a report that reflect the values that Virginians want to see in the redistricting process. Almost unanimously, Virginia citizens who addressed the Commission said they place a high premium on creating compact districts that reflect commonsense communities. The Commission's model maps reflect these interests, and two of those maps are evaluated here: one for the House of Delegates and one for the Virginia Senate.

Second, this redistricting cycle has also blessed the Commonwealth's decision makers with a great number of maps put forward by outstanding students from universities across Virginia. The Virginia College and University Redistricting Competition resulted in more than 50 maps that attempt to create more compact, equal-population districts without regard to political advantage or incumbency. The Competition's winning maps for the House of Delegates and Virginia Senate are presented here as real alternatives for comparison and consideration.

This paper includes statewide versions of the Commission's model maps, the winning maps from the student Competition, and the plans passed by the General Assembly in HB5001. All will be evaluated and compared, with the results presented in charts according to measurable criteria. Detailed maps of the Northern Virginia, Richmond, and Hampton Roads areas are included where they illustrate the analysis.

Criteria and Metrics for Evaluation

Besides the wide array of alternative maps, the availability of common metrics for evaluating these maps has made this redistricting cycle in Virginia particularly important. The availability of software for redistricting has made it possible for policymakers, the press, and everyday citizens to judge the efficacy of any map along similar criteria and metrics. The following criteria and metrics will be used to evaluate the maps in this report:

1. Equal Population

The U.S. Constitution requires that districts for state legislatures be roughly equal in population, with the courts allowing as great as a 10 percent deviation from the ideal population.[1] Less deviation would be desirable under the "one person, one vote" standard. However, leeway on equal population provides map drawers more flexibility in meeting other important criteria, such as compactness, respecting city and county boundaries, and maintaining communities of interest. This report will use percent deviation from ideal district size as the primary metric for measuring according to the standard of equal population.

2. Voting Rights Considerations

The federal Voting Rights Act requires that Virginia does not retrogress by reducing the ability of minority groups to elect a candidate of their choice or by "diluting" minority voting power. In Virginia, the African-American population is the primary group of interest in voting rights considerations. The primary metrics used to ensure legal compliance with the Voting Rights Act are the number of majority-minority districts and the percentage of the voting-age population in a district that is part of a minority group.

3. Maintaining County and City Boundaries

Maintaining the boundaries of local jurisdictions in redistricting is a worthy goal for many reasons, including reducing voting confusion, maintaining communities of interest, and saving localities the expense of redrawing voting precincts to conform to new legislative districts.[2] The metric used to measure conformity to county and independent city boundaries is counting the number of county splits. If a county is completely within a district it is split zero times. If parts of two districts are in a county it is split twice; three districts, three splits; and so forth.

4. Compactness

Districts that are compact make sense to voters and foster better constituent ties than districts that stretch and contort to connect disparate communities. This report uses the same metric used by the Advisory Commission to compare different maps, which compares the shape of the district to a perfect circle of the same area.[3] A higher percentage score for this metric indicates a higher degree of compactness. A score of 100% would be a perfect circle. Currently, the least compact district for the Virginia Senate has a score of 35.75% while the most compact is scored at 64.09%. For the House of Delegates, the least compact is 30.87% and the most compact is 76.31%. However, compactness is also a visual criterion; so this report will show examples of compactness for each alternative map.

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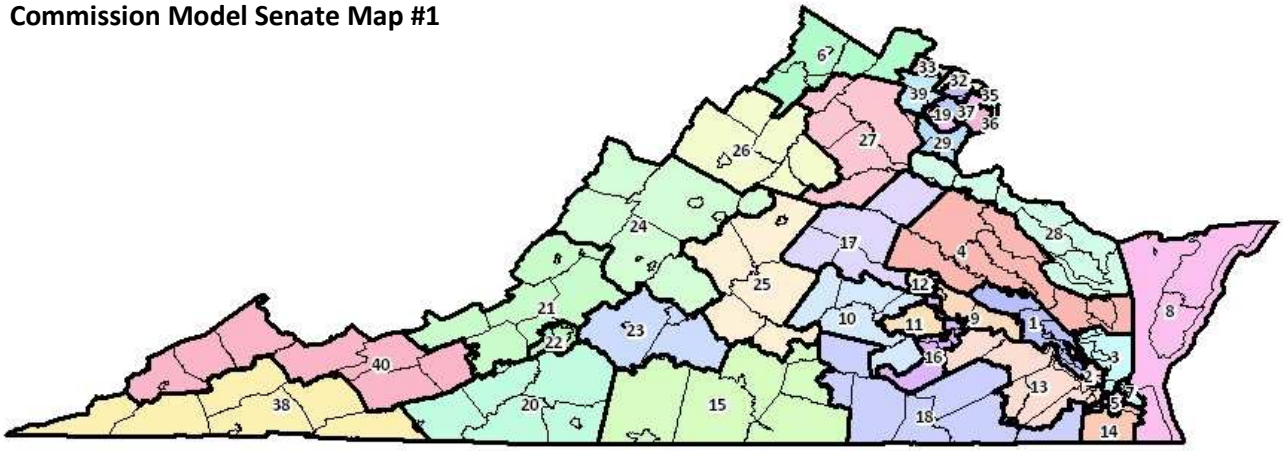
[1] The section on Constitutional and Legal Issues in the final report of the Independent Bipartisan Advisory Commission on Redistricting noted that, unlike drawing congressional districts, which must be exactly equal in population, the U.S. Supreme Court case of *Mahan v. Howell* (1973) resolved that "broader latitude has been afforded the States under the Equal Protection Clause in state legislative redistricting." It also cited the population deviation benchmark in *Daly v. Hunt* (F.3d 1212, 1218 (4th Cir. 1996)), which states that "If the maximum deviation is less than 10%, the population differential will be considered *de minimis* and will not, by itself, support a claim of vote dilution."

[2] The president of the Voter Registrars Association of Virginia, Larry Haake, told a joint hearing of the House and Senate Privileges and Elections Committees on April 4 that the plans could cost local governments as much as $6.7 million.

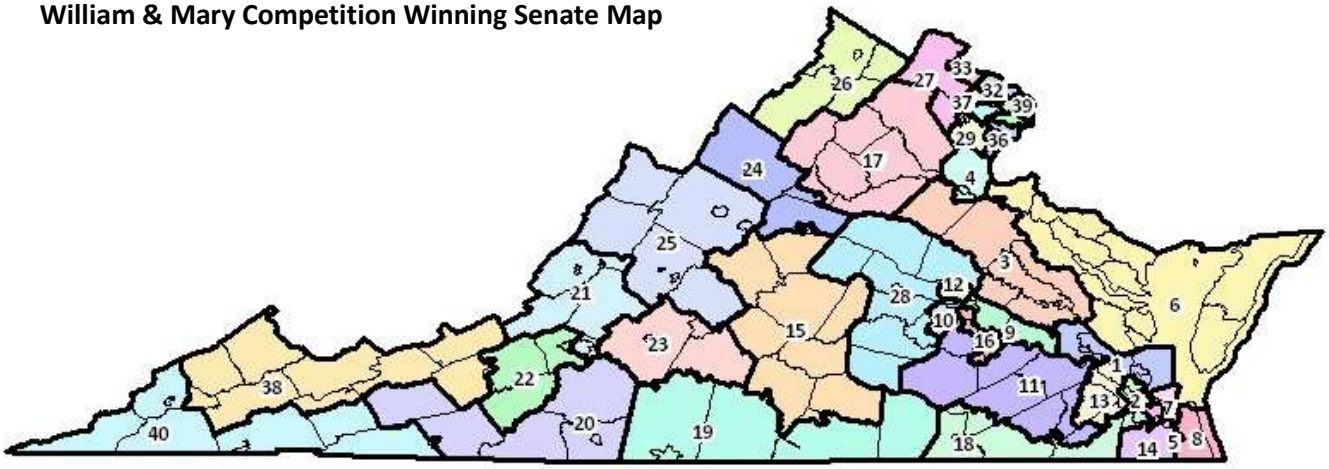
[3] The Schwartzberg measure of compactness is the ratio of the perimeter of the district to the perimeter of a perfect circle of the same area.

The Senate Maps

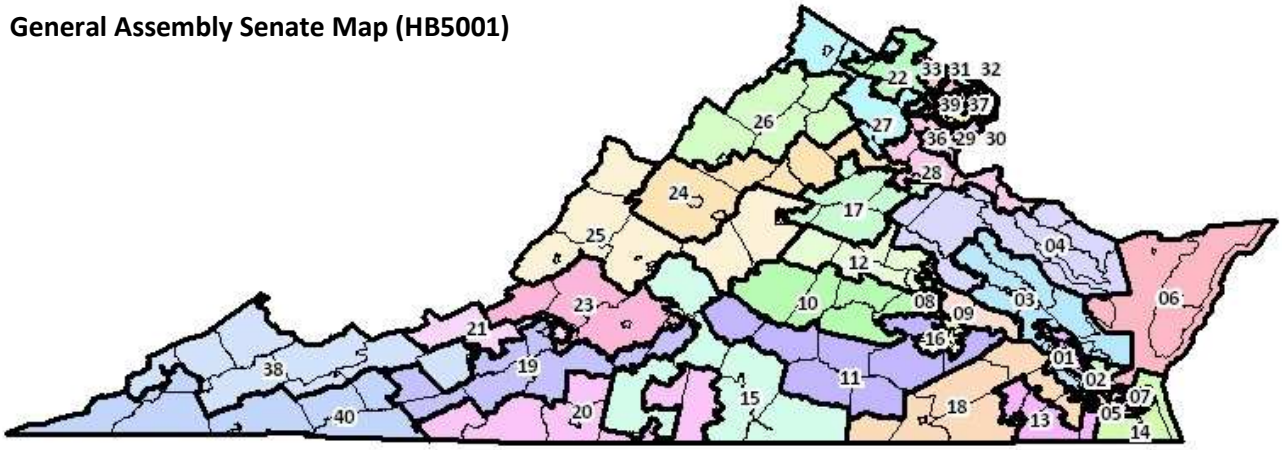
Commission Model Senate Map #1



William & Mary Competition Winning Senate Map



General Assembly Senate Map (HB5001)



Senate Map Evaluation

This section compares the current Senate map with the maps passed by the General Assembly in HB5001, included in the Advisory Commission's final report, and judged the winner in the student Competition (William & Mary Undergraduate Team).

Equal Population

The following table summarizes the performance of all of the Senate maps according to the metrics for equal population:

Map	Average Percent Deviation	Districts Under 1% Deviation	Districts Under 2% Deviation	Districts Under 3% Deviation	Districts Under 4% Deviation	Districts Under 5% Deviation
Commission Model Map #1	0.82%	26	40	40	40	40
William & Mary Map	1.72%	20	27	31	36	40
General Assembly Map	1.13%	18	40	40	40	40

The most equal in terms of population per district is the Commission's model map, with an average percent deviation of only 0.82. The least equal in population is the Competition map from William & Mary, which allowed for a percent deviation greater than the plus or minus 2 percent deviation limit imposed by the Commission and the Virginia Senate.

Voting Rights Considerations

The following table presents the voting-age African-American population percentages for each of the majority-minority districts proposed by each map:

District	Commission Model Map #1	William & Mary Map	General Assembly Map	Current Senate Map (2000 Data)
2	56.53%	54.66%	52.20%	55.80%
5	57.79%	52.06%	54.36%	55.90%
9	57.49%	54.66%	52.68%	55.00%
16	53.52%	50.67%	53.06%	55.90%
18	57.43%	50.36%	53.56%	58.50%

The Commission's model map has percentages comparable to the percentages that passed Department of Justice preclearance scrutiny in 2001 (Current Senate Map). In the map by the students from William & Mary and the map that passed the General Assembly, all of the majority-minority districts have black voting age populations lower than the plan approved in 2001. All are still higher than 50%, although two districts in the William & Mary map barely exceed that standard. The Commission model map proposes three districts that exceed the 2001 percentages and two that are lower; making any argument claiming minority voter dilution very difficult.

Maintaining County and City Boundaries

The following table presents the total number counties and independent cities that are split by the proposed Senate districts in each map:

Map	Number of County and City Splits
Commission Model Map #1	72
William & Mary Map	76
General Assembly Map	136
Current Senate Map	110

The Commission model map and the William & Mary student map have much fewer splits compared to the current Senate map, with a greater than 30 percent reduction in splits for each. However, the map passed by the General Assembly in HB5001 increases the number of county and city splits to 135, an increase of 23 percent.

Compactness

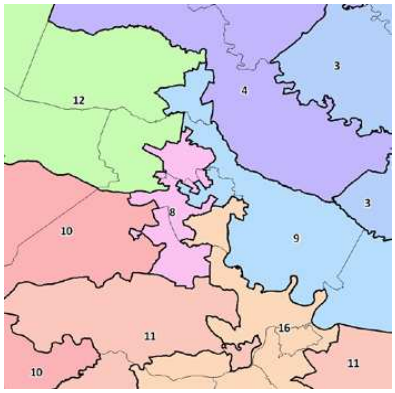
The table below summaries the compactness scores for all of the alternative maps and compares them to the current Senate map.

Map	Average Compactness	Most Compact	Least Compact
Commission Model Map #1	53.29%	72.00%	35.68%
William & Mary Map	56.99%	72.53%	39.18%
General Assembly Map	38.57%	54.47%	30.79%
Current Senate Map	48.21%	64.09%	35.75%

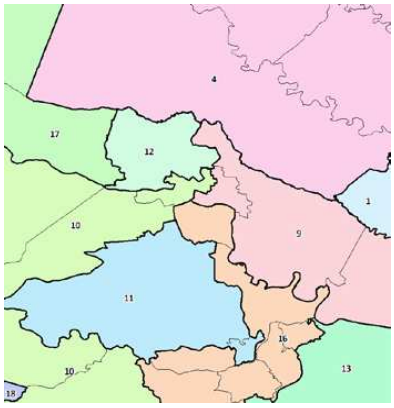
The Commission model map and the student map are significant improvements on the current Senate map, while the new map passed by the General Assembly is significantly worse than the current Senate map. The map in HB5001 has an average compactness score of only 38.62%, almost 10 points lower than the current map.

The map passed by the General Assembly also has the least compact district, District 8 around the city of Richmond, out of all of the districts in all four maps. The following maps show how the Richmond metropolitan area and surrounding counties are drawn for each alternative:

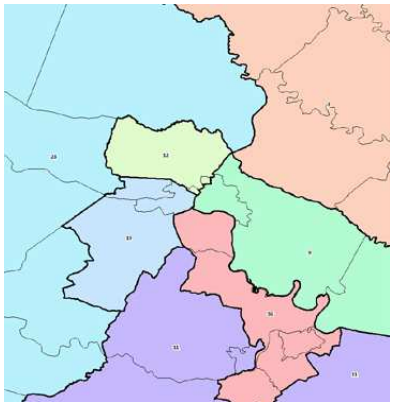
General Assembly Senate Map
Richmond Detail
Least Compact District #8



Commission Model Senate Map #1
Richmond Detail

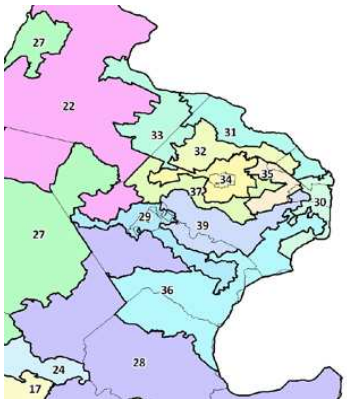


William & Mary Competition Winning Senate Map, Richmond Detail



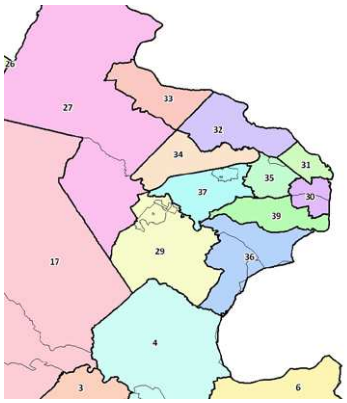
The Commission model map and the William & Mary map are more compact in the Richmond area and do a better job conforming to county and city boundaries than the map passed by the General Assembly. A similar pattern is found in Virginia's other urban areas.

General Assembly Senate Map
Northern Virginia Detail



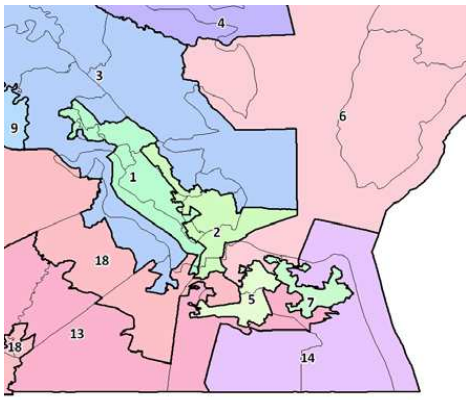
Commission Model Senate Map #1
Northern Virginia Detail

William & Mary Competition Winning Senate Map, Northern Virginia Detail

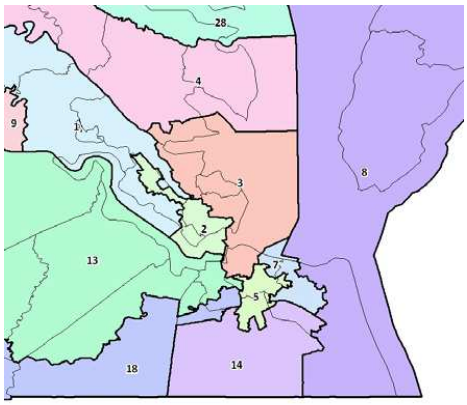


These maps show Fairfax and surrounding counties, the most heavily populated part of the Commonwealth. The proposed shapes for District 29 around the city of Manassas and Prince William County highlight the differences in compactness between the three alternative maps. The General Assembly map is least compact with this district at 31.35%, the Commission model next at 55.40%, and the William & Mary map most compact at 62.85%.

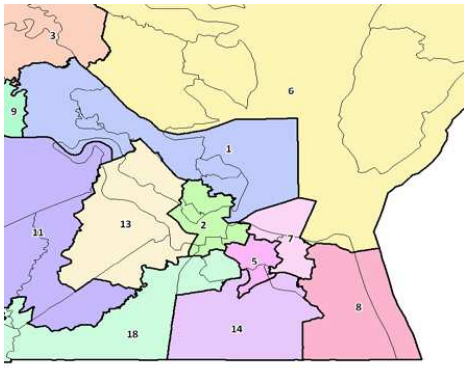
General Assembly Senate Map
Hampton Roads Detail



Commission Model Senate Map #1
Hampton Roads Detail



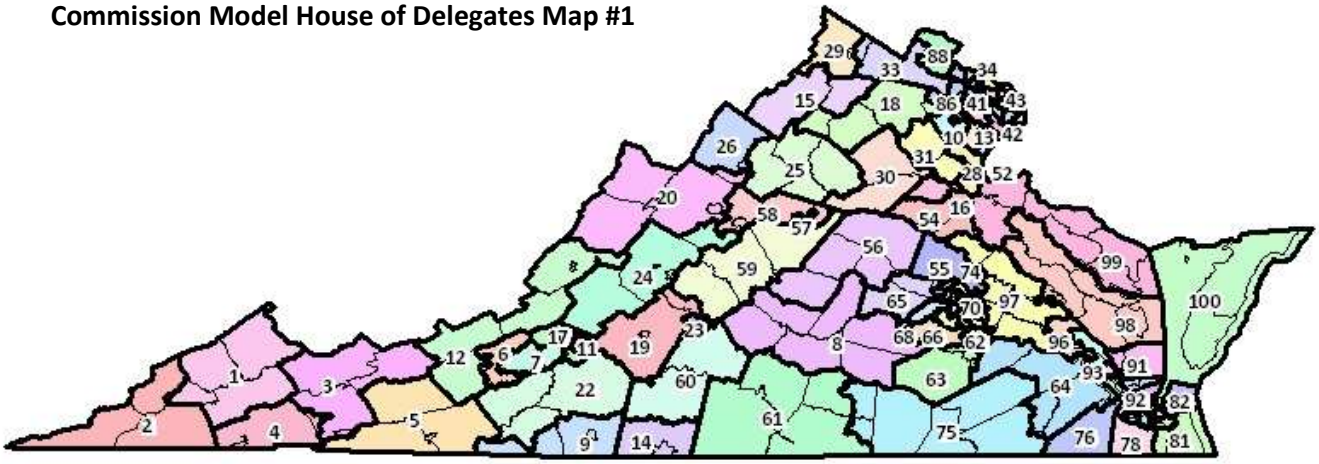
William & Mary Competition Winning Senate Map, Hampton Roads Detail



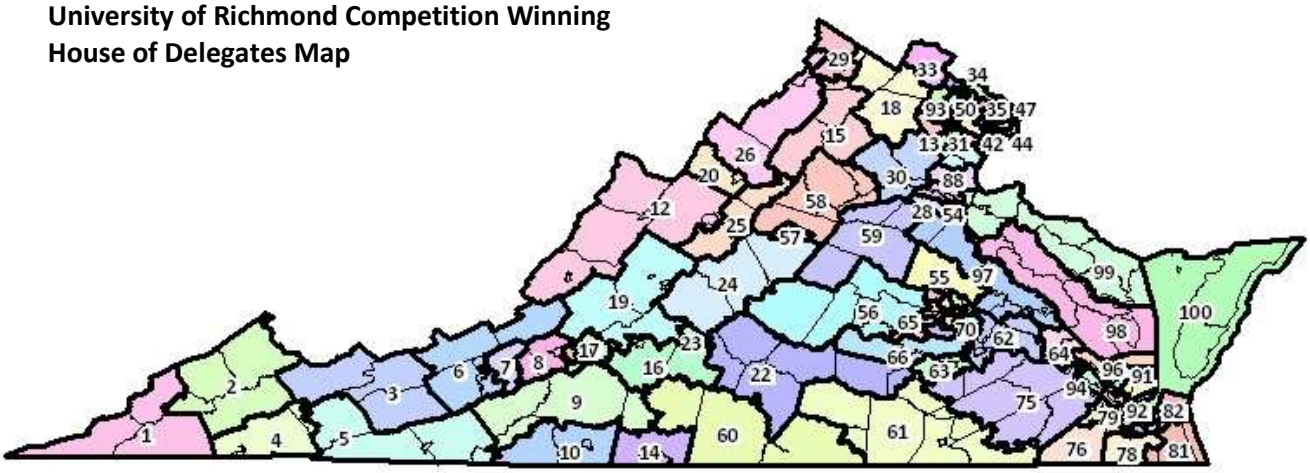
In the Hampton Roads area, again there is a dramatic difference in compactness between the three alternatives. A significant example is the compactness of District 5 (a majority-minority district that needs to maintain over 50% African-American voting-age population): General Assembly Map (41.07%), Commission Model Map (44.52%), William & Mary Map (56.28%).

The House of Delegates Maps

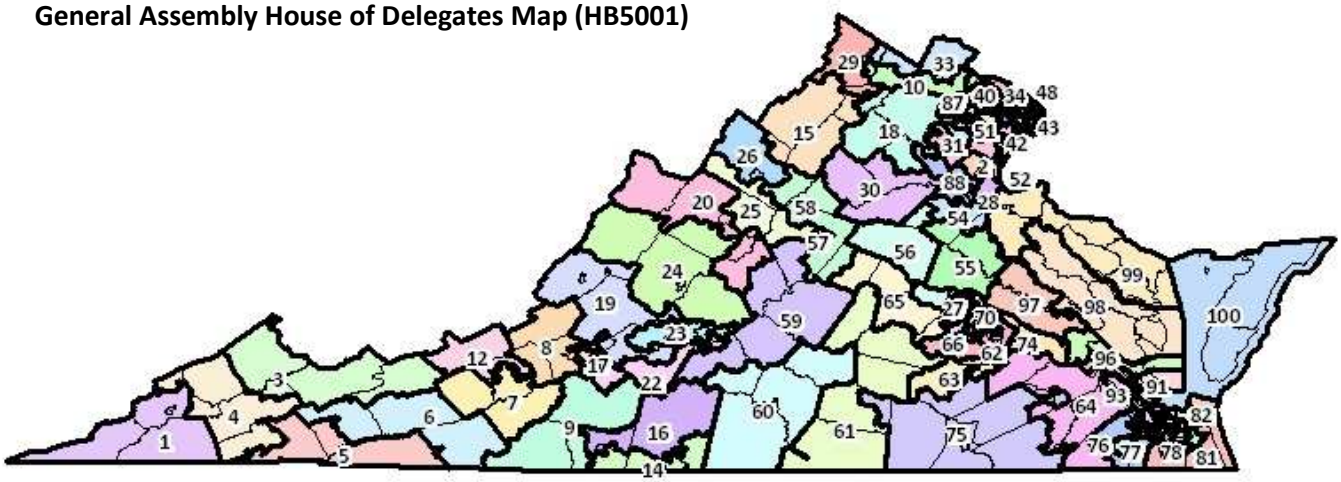
Commission Model House of Delegates Map #1



University of Richmond Competition Winning House of Delegates Map



General Assembly House of Delegates Map (HB5001)



House of Delegates Map Evaluation

This section compares the current House of Delegates map with the maps passed by the General Assembly in HB5001, included in the Advisory Commission's final report, and judged the winner in the student Competition (University of Richmond Undergraduate Team).

Equal Population

The following table summarizes the performance of all of the House of Delegates maps according to the metrics for equal population:

Map	Average Percent Deviation	Districts Under 1% Deviation	Districts Under 2% Deviation	Districts Under 3% Deviation	Districts Under 4% Deviation	Districts Under 5% Deviation
Commission Model Map #1	1.20%	39	100	100	100	100
University of Richmond Map	1.57%	43	69	86	94	100
General Assembly Map	0.62%	100	100	100	100	100

The House districts in the General Assembly map are closest to equal population, with all districts under a 1% population deviation and average percent deviation of 0.63%. The Commission model shows all districts under a 2% deviation. The districts in the student Competition map from the University of Richmond are the least equal in population, having allowed some districts to approach the court-permitted limit of plus or minus 5%. At 1.57%, the average deviation in the student map is still below the 2% threshold.

Voting Rights Considerations

The following table presents the voting-age African-American population percentages for each of the majority-minority districts proposed by each map:

District	Commission Model Map #1	University of Richmond Map	General Assembly Map	Current House Map (2000 Data)
63	56.09%	51.45%	60.08%	57.80%
69	55.17%	54.41%	56.25%	57.60%
70	54.40%	56.13%	58.47%	57.20%
71	53.96%	50.25%	56.49%	55.50%
74	56.83%	50.48%	57.88%	59.70%
75*	54.68%	50.08%	55.68%	56.20%
77	54.57%	51.99%	59.39%	55.90%
80	54.89%	51.00%	56.98%	55.30%
89	54.22%	50.76%	56.57%	53.40%
90	53.52%	50.11%	57.18%	54.00%
92	57.97%	51.23%	61.94%	59.30%
95	55.28%	57.11%	61.16%	58.10%

* District 75 is labeled as District 61 in the University of Richmond map

The General Assembly map has percentages comparable to the percentages that passed Department of Justice pre-clearance scrutiny in 2001 (Current House Map). The Commission model map has African-American populations well above 53 percent for all districts. In the University of Richmond student map, all of the majority-minority districts have African-American voting age populations below the levels in the current House map. Five of those districts barely exceed 50 percent. The General Assembly map would create eight districts that exceed the 2000 percentages and four that are lower. An argument of minority voter dilution would be difficult to make about the Commission and General Assembly maps.

It should also be noted that the Advisory Commission recognized in its final report that it is possible to make a 13th African-American majority-minority House of Delegates district with a few adjustments to the shapes of the Hampton Roads districts in its model map. The African-American voting age population exceeds 53 percent in all 13 majority-minority districts in that Commission model.

Maintaining County and City Boundaries

The following table presents the total number counties and independent cities that are split by the proposed House of Delegates districts in each alternative map:

Map	Number of County and City Splits
Commission Model Map #1	153
University of Richmond Map	177
General Assembly Map	198
Current House of Delegates Map	194

The Commission model map and the University of Richmond student map split fewer cities and counties than the current House of Delegates map. They reduce the number of splits by 21 and 9 percent respectively. The map that was passed by the General Assembly as HB5001 *increases* the number of county and city splits to 198, an increase of 2 percent.

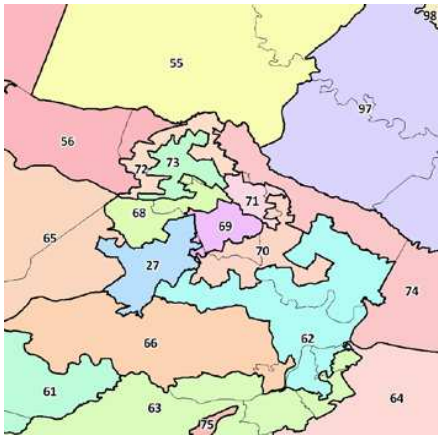
Compactness

The table below summarizes the compactness scores for all of the alternative maps and compares them to the current House of Delegates map:

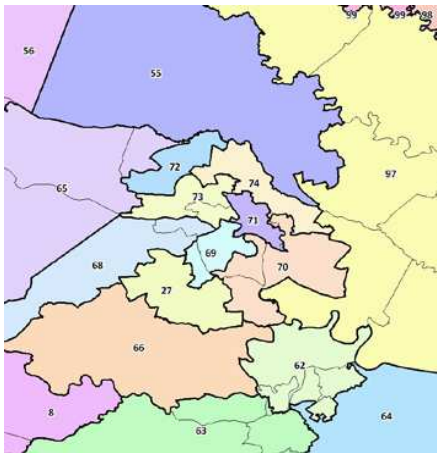
Map	Average Compactness	Most Compact	Least Compact
Commission Model Map #1	58.57%	82.54%	35.78%
University of Richmond Map	57.57%	78.17%	35.64%
General Assembly Map	47.53%	74.55%	27.65%
Current House of Delegates Map	49.78%	76.31%	30.87%

The Commission model map and the student map are significant improvements on the current House of Delegates map by every measure: average compactness, most compact district and least compact district. In contrast, the House of Delegates map passed by the General Assembly as HB5001 shows deterioration by every measure of compactness. The map passed by the General Assembly has the least compact district, District 72 around the city of Richmond.

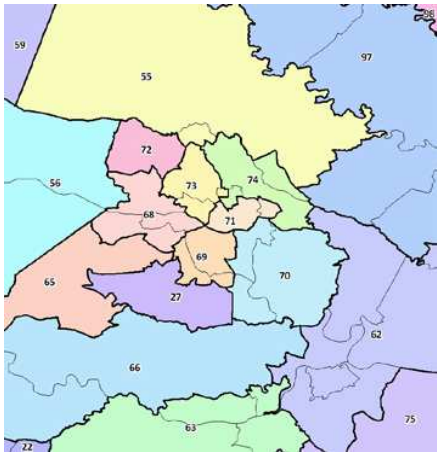
General Assembly House of Delegates Map (HB5001), Richmond Detail
Least Compact District #72



Commission Model House of Delegates Map #1, Richmond Detail



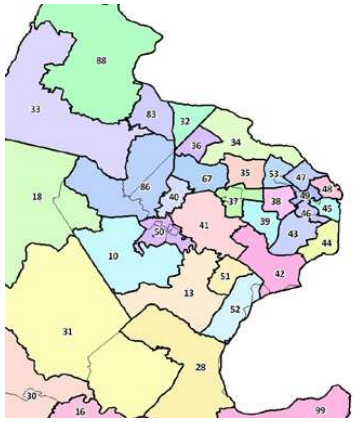
University of Richmond House of Delegates Map, Richmond Detail



The Richmond-area districts are much more compact in the Commission's model map and in the map drawn by the students from the University of Richmond, compared to the map passed by the General Assembly. To illustrate this, the compactness score for District 72 for the General Assembly map is 27.65% while the score for the Commission's map is 56.03% and the score for the student map is 69.38%. A similar pattern is found in Virginia's other urban areas.

General Assembly House of Delegates Map (HB5001), Northern Virginia Detail

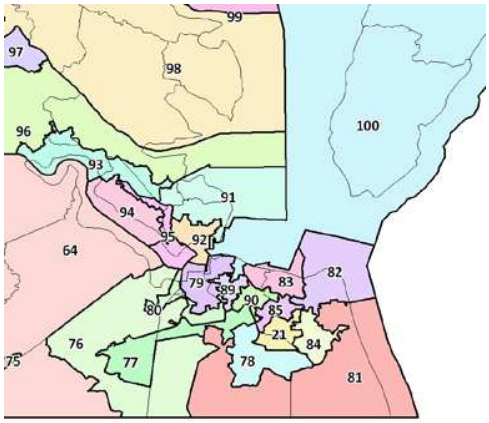
Commission Model House of Delegates Map #1, Northern Virginia Detail



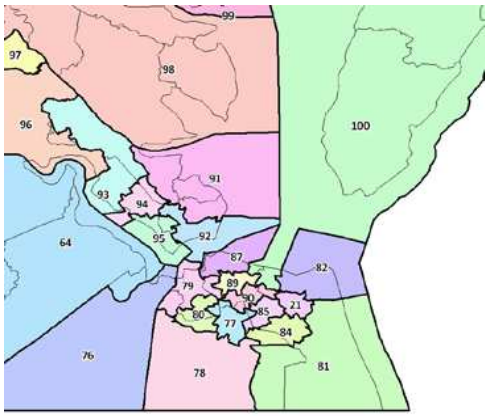
University of Richmond House of Delegates Map, Northern Virginia Detail

These maps show Fairfax and surrounding counties, the most heavily populated and densest part of the Commonwealth. The average compactness in Northern Virginia of the student map and the Commission map far exceeds the average compactness of the map passed by the General Assembly.

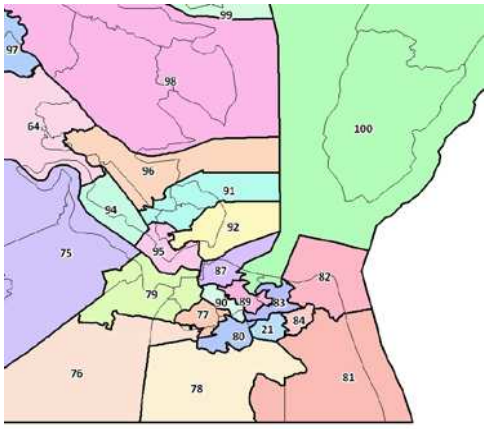
General Assembly House of Delegates Map (HB5001), Hampton Roads Detail



Commission Model House of Delegates Map #1, Hampton Roads Detail



University of Richmond House of Delegates Map, Hampton Roads Detail



In the Hampton Roads area, the difference in compactness between the three maps follows the same dramatic pattern. A significant example is the difference in compactness scores for District 77 (a majority-minority district that needs to maintain over 50% African-American voting-age population): Least compact is the General Assembly Map (39.34%). The Commission Model Map improves (56.36%) and the University of Richmond Map is the most compact (60.89%).

Conclusions

The quantitative measures applied in this paper show clearly that the redistricting maps passed by the General Assembly as HB5001 create *worse* legislative districts than are currently in place, according to criteria articulated by Gov. McDonnell and strongly endorsed by citizens in public hearings around the Commonwealth: They are less compact, increase the number of cities and counties split between legislative districts and disrupt established communities of interest.

The same impartial metrics show that the alternative maps added to the process for the first time by the Independent Bipartisan Advisory Commission on Redistricting and the Virginia College and University Redistricting Competition would significantly improve districts by those criteria. The General Assembly districts in HB5001 are closest to equal population, but by establishing such strict limits on population deviation between districts, the General Assembly sacrificed the other, equally valid criteria.

If the districts in HB5001 are not amended and improved, the 2011 redistricting process will mark a decade of decline for commonsense standards of representation in the House of Delegates and Virginia Senate.