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TESTIMONY ON SENATE STAFF MAP PROPOSAL BEFORE THE REDISTRICTING SUBCOMMITTEE OF THE SC SENATE JUDICIARY COMMITTEE

November 12, 2021

I would like to begin by thanking the Senate staff for their work on the map that they have proposed, especially for their careful consideration of the comments received from the public and from the League of Women Voters and other concerned organizations. We believe the proposed map is a significant improvement on the current Senate district configuration. The Senate staff map has much to recommend it as well as some specific areas of concern that we hope can be addressed.

We will first address the most common issue in redistricting, that the map might be unfair, a gerrymander. Much of the public thinks of fairness of maps in terms of a very basic measure, partisan proportionality. Would the major parties win the same proportion of legislative seats as the statewide vote for president or governor would suggest, which in South Carolina is usually about 55% Republican to about 45% Democratic? Again, population distributions prevent perfect proportionality in South Carolina's legislative maps, but ratings from Dave's Redistricting App indicate that the map submitted by the Senate staff improves on the current level of proportionality and achieves a "good" score on that measure.¹

We also see that the Senate staff map produces 10 districts in which the partisan lean margin is $\pm 5\%$, which is considered competitive in general elections. This is equal to the number of competitive districts in the League's map. (See Appendix for individual district figures.) We believe that this is an important virtue in the Senate proposal.

We examined the question of bias and potential gerrymandering very thoroughly. Anna Marie Vagnozzi and Dr. Matthew Saltzman and their team of advanced mathematics students at Clemson University continued the work that they began last year when they evaluated current districts. Information on the methodology of this study can be found in a thesis by Anna Marie Vagnozzi, which can be provided to the committee in digital form on request.² We wish to add that this analysis is one example of the excellent and important work that South Carolina's universities do to bring deep scholarly expertise to the service of our state to inform policy issues of public importance.

An initial review of the current Senate Staff map is shown in Appendix 1. The plan now proposed by the Senate staff has a strong underlying partisan bias with respect to the *median-mean* measure, which is widely accepted and commonly used in election map analysis. After $2^{30} \approx 1$ billion maps were sampled, the p-values were $p=0.030545$ for median-mean (500,889 maps found to have worse measures).³ In comparison, the scores for

¹ <https://davesredistricting.org/join/269499c2-0ea8-4b4b-b088-f03c77db5ae4>

² Anna Marie Vagnozzi, "Detecting Partisan Gerrymandering through Mathematical Analysis: A Case Study of South Carolina," MS Thesis, the Graduate School of Clemson University, May 2020.

³ In the context of the simulation, the p-value is the probability of seeing a map as extreme as this or more so if one is drawn at random from the population of maps that we sampled in the simulation. Those have districts that are contiguous, within population limits ($\pm 5\%$), and no less compact overall than the proposed map.

the LWVSC proposal are $p=0.028358$ for median-mean (431,754 maps were worse). Therefore, the analysis shows that in this respect the Senate proposal and that of the LWVSC are not very different. The LWVSC plan serves as a control sample, because we know with certainty that it was not manipulated to produce a given partisan or incumbent protection result. Any bias is a result of underlying demography. We conclude that this measure does not show a serious defect in the Senate map.

The Senate plan does show greater evidence of geometric partisan bias (1,361,894 maps found to have worse measures at $p=0.050366$) than the League map (17,485,733 maps were worse at $p=0.18047$). Our overall conclusion on this measure is that the Senate map could be improved in this respect, but given other measures that we have examined, we do not consider this a fatal flaw.

We especially appreciate the much-improved attention to keeping voting precincts intact in the Senate proposal, with only 5 such splits in contrast to the 151 precinct splits in the current map. It is possible to micro-engineer districts to produce districts with wildly distorted partisan imbalances by splitting voting precincts into multiple fragments to enhance partisan consistency within districts. This practice is harmful to our politics but the Senate staff plan does not do that. The partisan gap estimated for this map is an average or mean of about 25 percent, down from 27.5 in the current maps and only 1% more than the mean 24% difference between winners and losers that would be expected in the League map. Bluntly put, the Senate staff map would give most incumbents an opportunity to retain their seats but doesn't exaggerate that effect by piling on unneeded percentage points. This is very important even when a district is not easily competitive, because more extreme districts produce more extreme politics for reasons we have discussed in previous hearings.

We understand that the staff attempted to respect county boundaries, although the number of county splits that they produced is not very different from that in current maps. The Senate staff has split 27 counties 69 times in contrast to the League's 21 counties split 45 times. Union County, which is relatively small, is split among Districts 9, 13, and 14. This, and some other differences, appear to be the consequence of the Senate's attention to preserving incumbents in their current districts. We appreciate that incumbent protection is not carried to an extreme in the staff plan but we continue to wish that this could become a criterion only at the lowest level of priority, after satisfaction of all voter-focused criteria.

We commend the mapmakers for working to ensure appropriate representation for cities, for example in keeping Spartanburg whole rather than splitting it as in the current map. However, the often-stated preference of Mt. Pleasant residents to be represented by a single senator was not realized. A wish for a single district is unrealistic (we also couldn't do that in the League map), but in the staff proposal Mt. Pleasant is again very fragmented, with representation from three senators.

Our remaining comments focus on specific districts of concern to minority voters. John Ruoff will discuss these. Some are of relatively low potential impact while at least one has more serious implications. Briefly, they are as follows:

- District 39 is of concern. As drawn in the Senate Staff map it probably provides minorities an opportunity to elect a candidate of their choice at present, but it is drawn with a relatively low 39% BVAP. We appreciate the staff not engaging in minority packing in this district, a practice that dilutes the influence of minority voters. In an area with less vigorous non-minority growth the district as drawn would be of less concern. However, the district includes areas in Berkeley County, including Nexton, Carnes Crossroads, and Cane Bay, where rapid population growth is primarily Non-Hispanic White and very different in character from the rural core of the rest of the district. The LWVSC plan has a 50% NHBVAP. The NAACP plan is at 43% NHBVAP but doesn't come as far into the growth areas

of Berkeley County. As the decade progresses the opportunity of minority voters in this area to elect a senator of their choice may be in danger as currently drawn in the Senate map.

Lesser Concerns:

- District 17 remains a minority influence district but includes significant areas of primarily White population growth, even reaching into Lancaster County. The future may not treat minorities well here.
- Districts 25 and 23 split Batesburg-Leesville and crack a Black community in that town, cutting Lexington School District 3 in two.
- Districts 25 and 24 crack the Black community in China Springs from that in the City of Aiken and crack a Black community at North Augusta.
- Districts 26 and 39 split St. Matthews in a way that cracks a Black community at a precinct line.

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APPENDIX 1

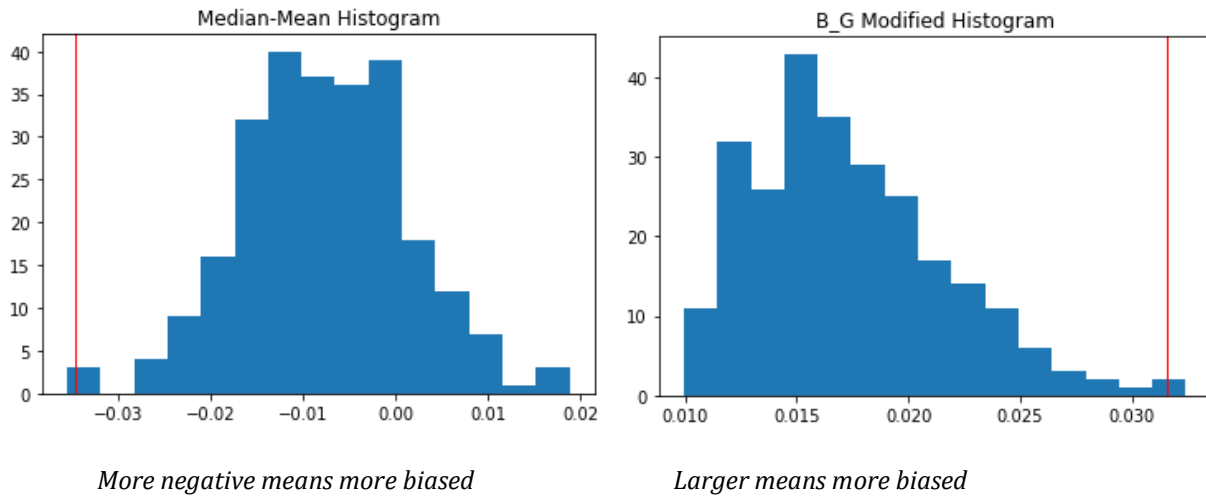
PROPOSED SENATE DRAFT

After $2^{30} \approx 1$ billion maps were sampled, the p-values were...

$p=0.030545$ for median-mean (500,889 maps found to have worse measures)

$p=0.050366$ for geometric partisan bias (1,361,894 maps found to have worse measures)

Distribution of measure statistics for a systematic sample (every 2^{22} steps) of maps:

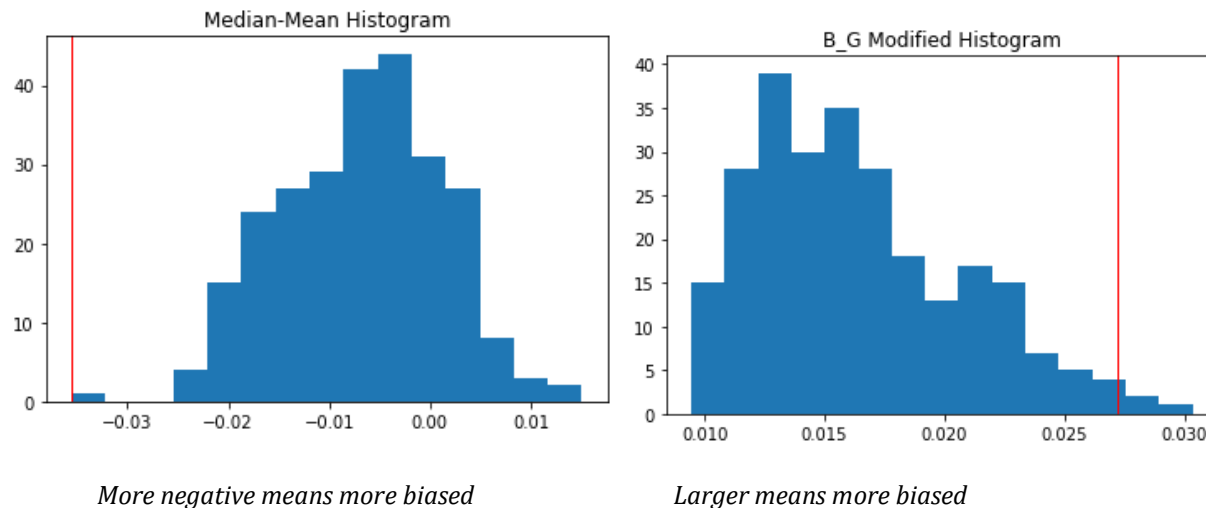


LWV'S SENATE MAP

$p=0.028358$ for median-mean (431,754 maps were worse)

$p=0.18047$ for geometric partisan bias (17,485,733 maps were worse)

Distribution of measure statistics for a systematic sample (every 2^{22} steps) of maps:

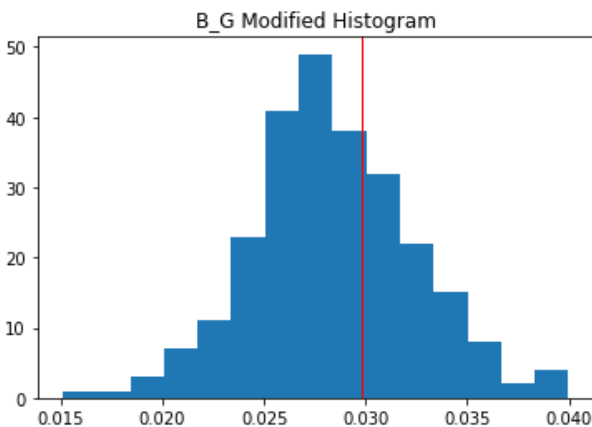
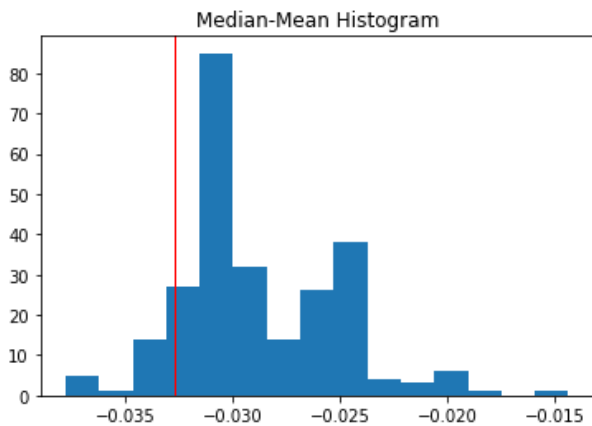


ORIGINAL (2011) MAPS - *what if we stick with what we had last time?*

p=0.46783 for median-mean (117,502,161 maps were worse)

p=0.15691 for geometric partisan bias (398,218,111 maps were worse)

Distribution of measure statistics for a systematic sample (every 2²² steps) of maps:



More negative means more biased

Larger means more biased

APPENDIX 2

BASIC SC SENATE STAFF MAP COMPARISON WITH CURRENT AND LWVSC MAPS

DAVE'S REDISTRICTING RATINGS

| | Current Districts | LWVSC Districts | Senate Staff Districts |
|-----------------|-------------------|-----------------|------------------------|
| Competitiveness | 18 | 23 | 16 |
| Proportionality | 69 | 71 | 76 |

| | | | |
|----------------------|----|----|----|
| Splitting (Counties) | 22 | 51 | 23 |
| Compactness | 41 | 50 | 43 |
| Minority | 87 | 87 | 86 |

ACTUAL SPLITS

| | | | |
|-----------------|---|---|--|
| County Splits | 34 counties split 63 times (44.06% of people in state affected) | 21 counties split 45 times (24.10% of people in state affected) | 27 counties split 69 times (38.9% of people in state affected) |
| Precinct Splits | 151 | 5 | 5 |

SENATE STAFF PLAN WITH 2020 PARTISAN LEAN COMPARISON

The district-by-district figures below are reasonable comparisons for those districts that have not changed markedly from those in the current Senate map or in the League proposal. However, in some cases geographic change is so great (for example, S. 20) that the comparison is useful only for contributing to statewide calculations.

Partisan Lean calculated as composite of 2016 Pres, 2020 Pres, 2016 Sen, 2020 Sen, 2018 Gov, 2018 AG

| District # | Partisan Lean % 2020 Districts | | | Partisan Lean % LWVSC Map Proposal | | | Partisan Lean % Senate Staff Map Proposal | | |
|------------|--------------------------------|-------------|------------|------------------------------------|----------------|----------|---|--------|----------|
| | Rep PL 2020 | Dem PL 2020 | 2020 PL NN | Rep 2020 LWVSC | Dem 2020 LWVSC | NN LWVSC | SS Rep | SS Dem | SS NN PG |
| 01 | 69.73 | 28.09 | 42 | 70.14 | 29.86 | 40 | 70.40 | 29.60 | 41 |
| 02 | 78.42 | 19.70 | 59 | 79.85 | 20.15 | 58 | 78.62 | 21.38 | 57 |
| 03 | 72.22 | 25.77 | 46 | 72.40 | 27.60 | 45 | 72.87 | 27.13 | 46 |
| 04 | 68.73 | 29.66 | 39 | 68.88 | 31.12 | 38 | 68.47 | 31.53 | 37 |

| | | | | | | | | | |
|----|-------|-------|----|-------|-------|----|-------|-------|----|
| 05 | 74.15 | 23.64 | 51 | 69.99 | 30.01 | 40 | 75.07 | 24.93 | 50 |
| 06 | 62.76 | 34.49 | 28 | 62.27 | 37.73 | 25 | 61.83 | 38.17 | 24 |
| 07 | 37.71 | 61.17 | 23 | 36.91 | 63.09 | 26 | 37.30 | 62.70 | 25 |
| 08 | 59.99 | 37.62 | 22 | 58.20 | 41.80 | 16 | 58.71 | 41.29 | 17 |
| 09 | 65.28 | 32.82 | 32 | 64.63 | 34.37 | 30 | 64.81 | 35.19 | 30 |
| 10 | 58.33 | 40.16 | 18 | 62.46 | 37.54 | 25 | 67.36 | 32.64 | 35 |
| 11 | 56.90 | 41.25 | 16 | 53.05 | 46.95 | 6 | 60.25 | 39.75 | 21 |
| 12 | 63.18 | 34.70 | 28 | 64.70 | 35.30 | 29 | 59.04 | 40.96 | 18 |
| 13 | 63.87 | 34.21 | 30 | 66.85 | 33.15 | 34 | 66.18 | 33.82 | 32 |
| 14 | 71.26 | 26.92 | 44 | 74.98 | 25.02 | 50 | 74.10 | 25.90 | 48 |
| 15 | 58.11 | 39.47 | 19 | 49.38 | 50.62 | 1 | 61.24 | 38.76 | 22 |
| 16 | 58.87 | 39.03 | 20 | 63.06 | 36.94 | 26 | 57.18 | 42.82 | 14 |
| 17 | 47.36 | 50.98 | 4 | 55.32 | 44.68 | 11 | 47.49 | 52.51 | 5 |
| 18 | 67.01 | 30.86 | 36 | 63.63 | 36.37 | 27 | 62.77 | 37.23 | 26 |
| 19 | 17.52 | 80.73 | 63 | 21.57 | 78.43 | 57 | 19.15 | 80.85 | 62 |
| 20 | 49.05 | 48.36 | 69 | 36.33 | 63.67 | 27 | 38.27 | 61.63 | 23 |
| 21 | 23.00 | 75.32 | 52 | 28.75 | 71.25 | 43 | 23.83 | 76.17 | 52 |
| 22 | 37.28 | 60.82 | 24 | 31.92 | 68.08 | 36 | 34.90 | 65.10 | 30 |
| 23 | 68.17 | 29.11 | 39 | 66.54 | 33.46 | 33 | 68.20 | 31.80 | 36 |
| 24 | 64.34 | 33.55 | 31 | 60.75 | 39.25 | 22 | 60.84 | 39.16 | 22 |

| | | | | | | | | | |
|----|-------|-------|----|-------|-------|----|-------|-------|----|
| 25 | 66.34 | 31.86 | 34 | 66.80 | 33.20 | 34 | 63.43 | 36.57 | 27 |
| 26 | 53.22 | 44.52 | 9 | 62.51 | 37.49 | 25 | 47.06 | 52.94 | 6 |
| 27 | 60.00 | 38.61 | 21 | 61.24 | 38.76 | 22 | 65.96 | 34.04 | 32 |
| 28 | 66.78 | 31.94 | 35 | 70.20 | 29.80 | 40 | 68.66 | 31.34 | 37 |
| 29 | 46.11 | 52.65 | 7 | 47.39 | 52.61 | 5 | 47.02 | 52.98 | 6 |
| 30 | 39.21 | 59.85 | 21 | 46.25 | 53.75 | 8 | 45.62 | 54.38 | 9 |
| 31 | 60.25 | 38.16 | 22 | 52.33 | 47.67 | 5 | 58.59 | 41.41 | 17 |
| 32 | 39.25 | 59.76 | 21 | 43.79 | 56.21 | 12 | 42.24 | 57.76 | 16 |
| 33 | 64.56 | 33.61 | 31 | 61.40 | 38.60 | 23 | 61.09 | 38.91 | 22 |
| 34 | 64.37 | 34.01 | 30 | 56.80 | 43.20 | 14 | 67.46 | 32.54 | 35 |
| 35 | 50.32 | 47.83 | 2 | 67.74 | 32.26 | 35 | 46.13 | 53.87 | 8 |
| 36 | 42.92 | 55.73 | 13 | 45.98 | 54.02 | 0 | 46.28 | 53.72 | 7 |
| 37 | 58.55 | 39.25 | 19 | 56.24 | 43.76 | 12 | 58.07 | 41.93 | 16 |
| 38 | 56.61 | 40.69 | 16 | 51.91 | 48.09 | 4 | 57.66 | 42.34 | 15 |
| 39 | 41.47 | 57.28 | 16 | 41.93 | 58.07 | 16 | 46.98 | 53.02 | 6 |
| 40 | 42.15 | 56.83 | 15 | 48.14 | 51.86 | 4 | 45.63 | 54.37 | 9 |
| 41 | 49.50 | 47.73 | 2 | 43.69 | 56.31 | 13 | 53.92 | 46.08 | 8 |
| 42 | 21.65 | 75.95 | 54 | 23.79 | 76.21 | 42 | 25.10 | 74.90 | 50 |
| 43 | 52.97 | 44.72 | 8 | 49.75 | 50.25 | 1 | 53.68 | 46.32 | 7 |
| 44 | 55.85 | 41.53 | 14 | 58.79 | 41.21 | 18 | 55.32 | 44.68 | 11 |

| | | | | | | | | | |
|----|-------|-------|----|-------|-------|----|-------|-------|----|
| 45 | 40.41 | 58.37 | 18 | 47.18 | 52.82 | 6 | 41.14 | 58.86 | 18 |
| 46 | 59.12 | 39.27 | 20 | 58.56 | 41.44 | 17 | 58.56 | 41.44 | 17 |

AVERAGE PARTISAN GAP

2020 SENATE DISTRICTS ELECTION PARTISAN GAP

| | |
|--------|---------|
| Count | 46 |
| Mean | 24.0652 |
| StdDev | 15.6040 |

2020 SENATE DISTRICTS PARTISAN LEAN GAP

| | |
|--------|---------|
| Count | 46 |
| Mean | 27.4565 |
| StdDev | 16.1558 |

LWVSC PROPOSAL PARTISAN LEAN GAP

| | |
|--------|---------|
| Count | 46 |
| Mean | 23.9348 |
| StdDev | 15.3527 |

SENATE STAFF PROPOSAL PARTISAN GAP

| | |
|--------|---------|
| Count | 46 |
| Mean | 25.0435 |
| StdDev | 15.2737 |

