

Computer Generated Maps using Multi-Objective Weighting

1 Congressional Map Dominated by Population Constraints:

$$\alpha = [1, 0, 0, 0]$$

We failed in 100 consecutive ReCom attempts, so we will stop here at count = 63.

Original population deviation from ideal = 1005103. Final population deviation = 431939

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.13678473563402835

Original CDI Count Score = 77. Final CDI Count Score = 80

The population of each district is [823675, 705434, 662262, 753910, 678806, 866938, 751177]

The compactness of each district is [0.15439966894269017, 0.11183460829472894, 0.11054713211719856, 0.21440181448499462, 0.14675506268811894, 0.07838193490823525, 0.14117292800223194]

The relative value assigned to the metrics was: Pop: 1, Compactness: 0, MM: 0, Counties: 0

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,005,103	431,939
PP Compactness	1	0.1387466383748516	0.13678473563402835
County-District Intersections	46	77	88

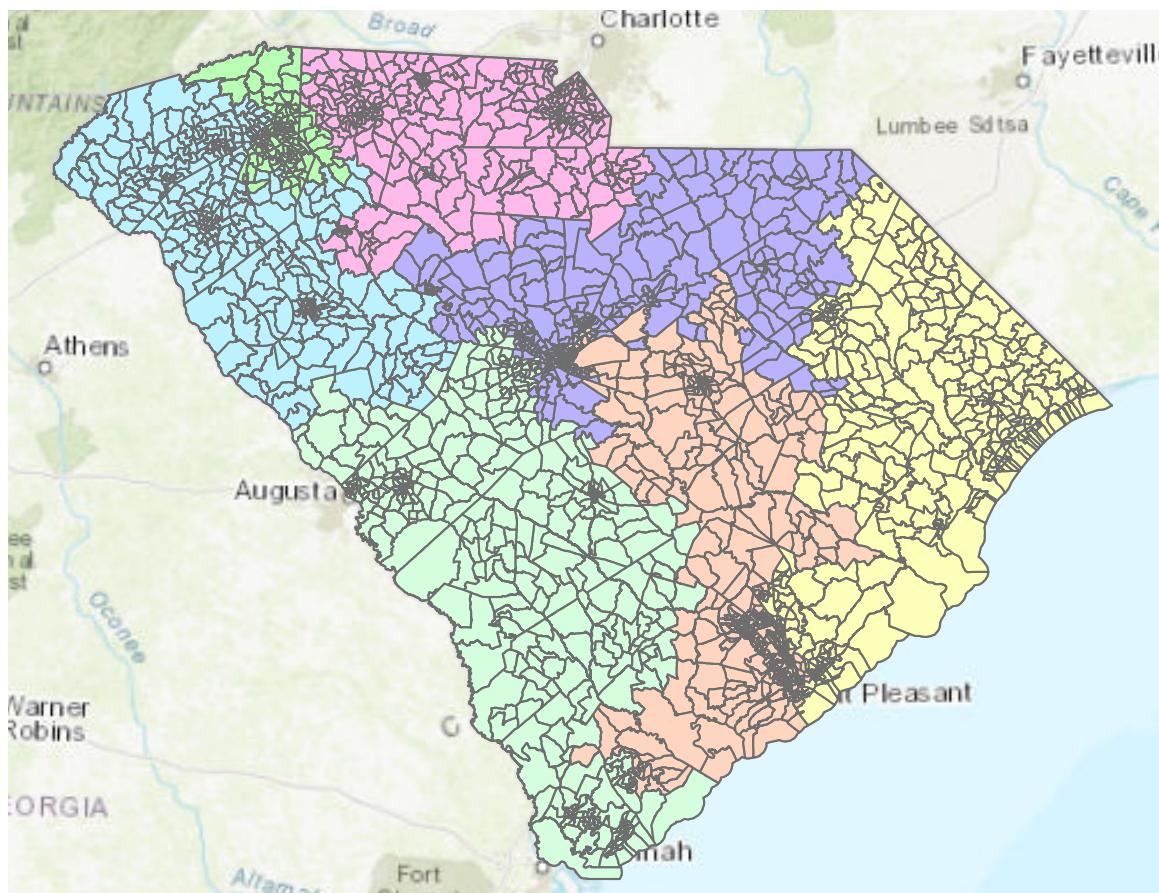


Figure 1: Congressional Map Dominated by Population Constraints

2 Congressional Map Dominated by Compactness:

$$\alpha = [0, 1, 0, 0]$$

We failed in 100 consecutive ReCom attempts, so we will stop here at count = 76.

Original population deviation from ideal = 1005103. Final population deviation = 1197442

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.22614455937406028

Original CDI Count Score = 77. Final CDI Count Score = 65

The population of each district is [473903, 629886, 510188, 736752, 673467, 971491, 1059384]

The compactness of each district is [0.19240299406689243, 0.2651250410850911, 0.18251840296136213, 0.2567431600924921, 0.263738630194676, 0.16769103505835042, 0.25479265215955754]

The relative value assigned to the metrics was: Pop: 0, Compactness: 1, MM: 0, Counties: 0

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,005,103	1,197,442
PP Compactness	1	0.1387466383748516	0.22614455937406028
County-District Intersections	46	77	65

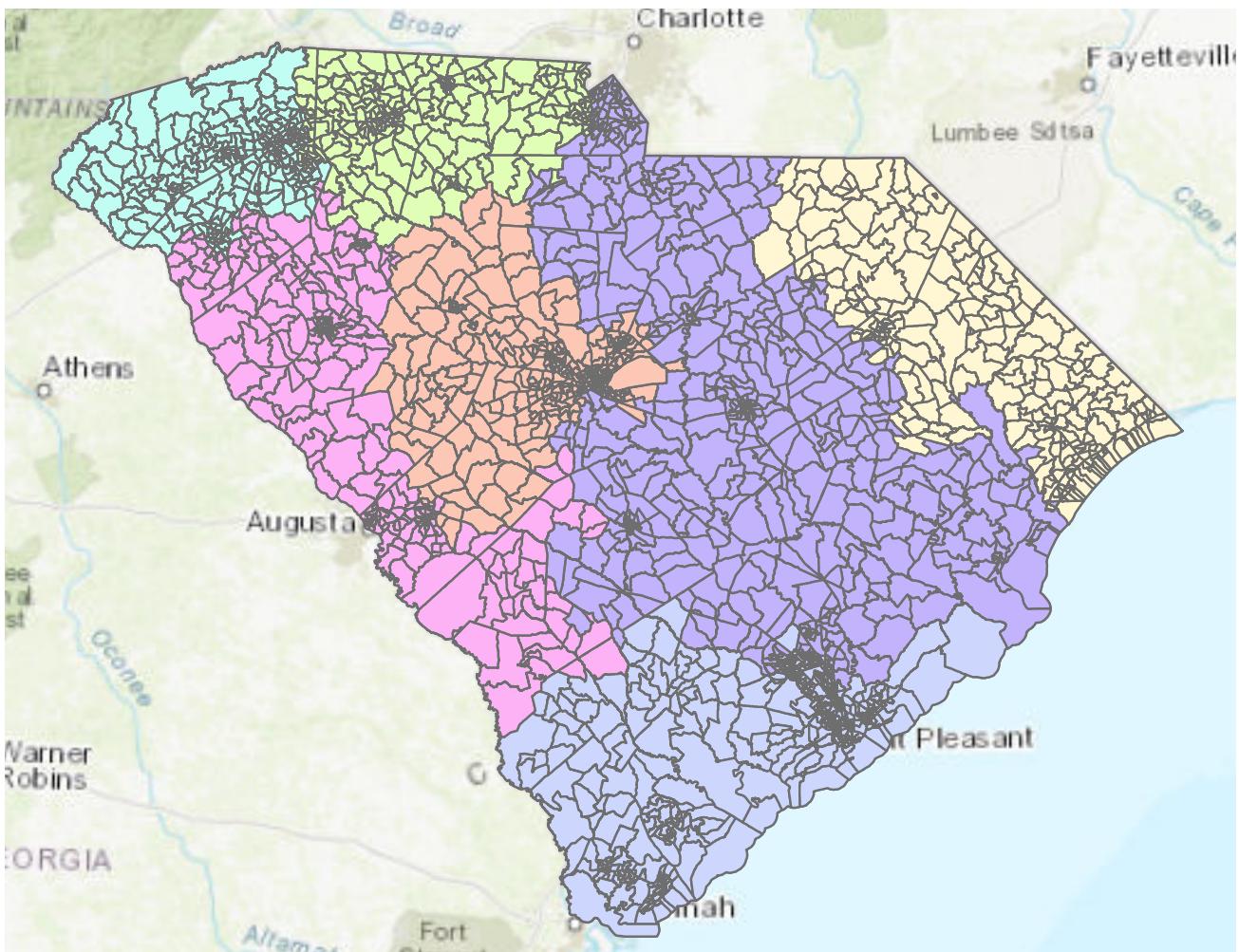


Figure 2: Congressional Map Dominated by Compactness

3 Congressional Map Dominated by Minimizing County-District Intersections:

$$\alpha = [0, 0, 0, 1]$$

We failed in 100 consecutive ReCom attempts, so we will stop here at count = 64.

Original population deviation from ideal = 1005103. Final population deviation = 1253559

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.10607810561840798

Original CDI Count Score = 77. Final CDI Count Score = 68

The population of each district is [943629, 444956, 748737, 562766, 617034, 996697, 906511]

The compactness of each district is [0.12884452798663887, 0.0985608291722491, 0.1178550710875155, 0.0823856931

0.12186862894844958, 0.09767762613897546, 0.09535436281642248]

The relative value assigned to the metrics was: Pop: 0, Compactness: 0, MM: 0, Counties: 1

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,005,103	1,253,559
PP Compactness	1	0.1387466383748516	0.10607810561840798
County-District Intersections	46	77	68

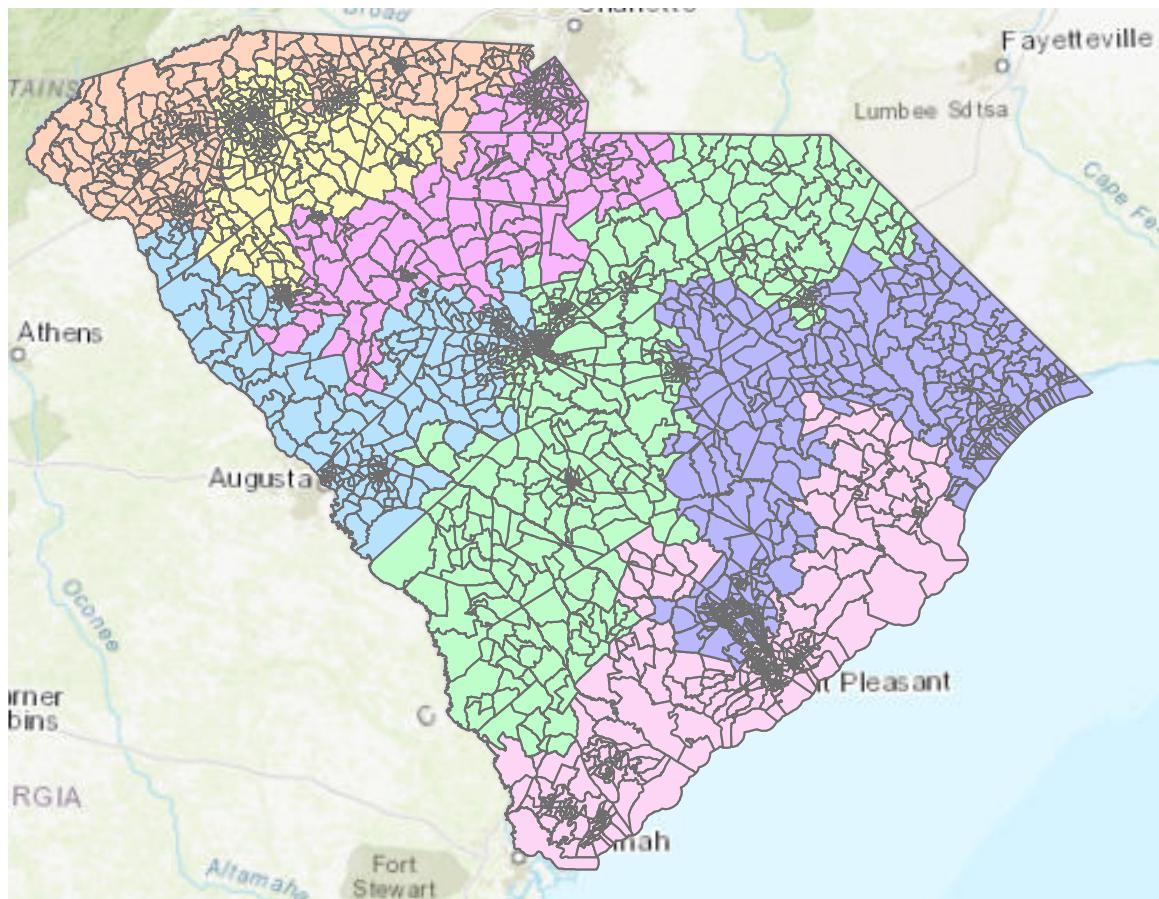


Figure 3: Congressional Map Dominated by Minimizing County-District Intersections

4 Congressional Map created by all objectives being equal:

$$\alpha = \left[\frac{1}{3}, \frac{1}{3}, 0, \frac{1}{3} \right]$$

We failed in 100 consecutive ReCom attempts, so we will stop here at count = 78.

Original population deviation from ideal = 1005103. Final population deviation = 306921

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.13859610465963212

Original CDI Count Score = 77. Final CDI Count Score = 61

The population of each district is [793966, 689240, 715249, 592820, 692473, 755165, 730313]

The compactness of each district is [0.16534070175088145, 0.0873117930372505, 0.18969305140557835, 0.15592766630514962, 0.16538317232594654, 0.08209485294048215, 0.12442149485213627]

The relative value assigned to the metrics was: Pop: 0.3333333333333333, Compactness: 0.3333333333333333, MM: 0, Counties: 0.3333333333333333

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,005,103	306,921
PP Compactness	1	0.1387466383748516	0.13859610465963212
County-District Intersections	46	77	61

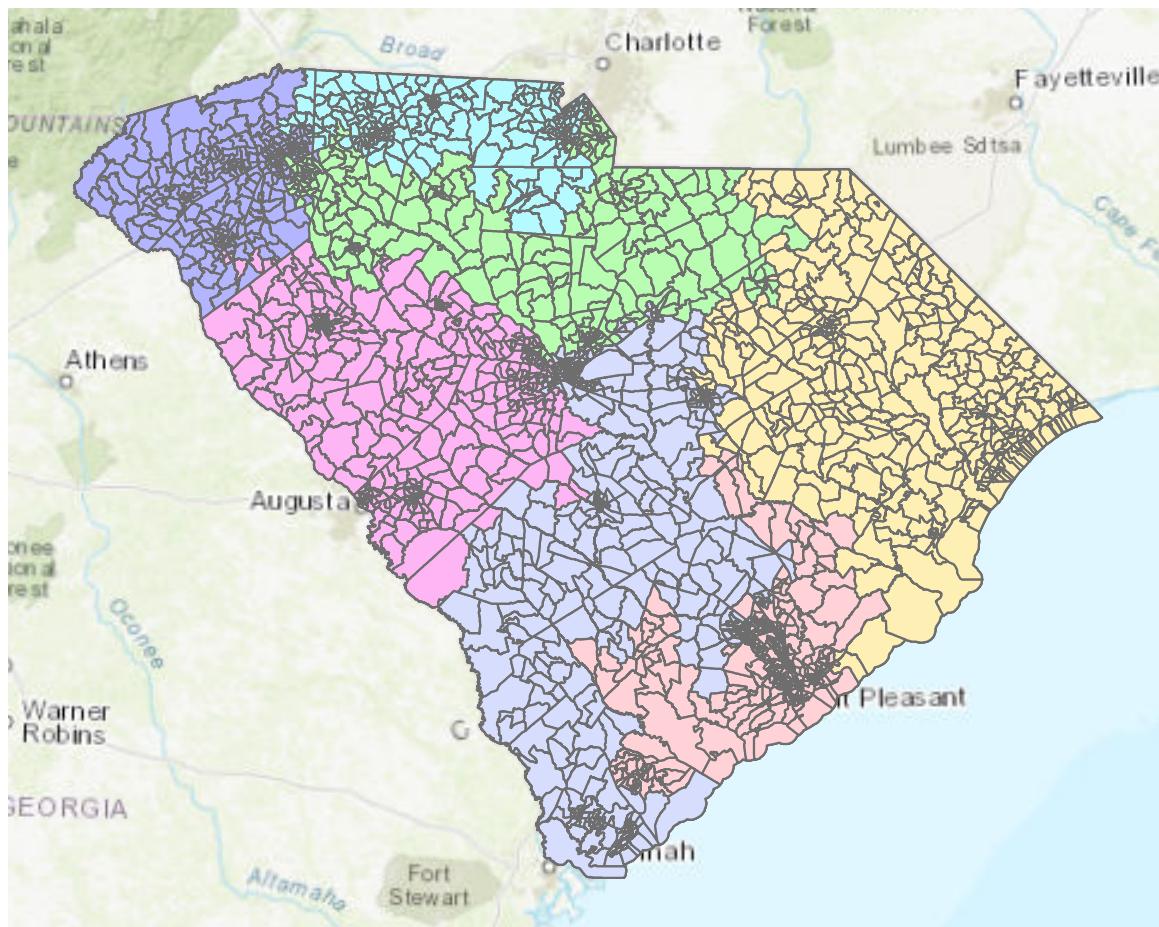


Figure 4: Congressional Map created by all objectives being equal

5 Congressional Map Dominated by Population Constraints while taking into account Compactness and Minimizing County-District Intersections:

$$\alpha = [0.70, 0.15, 0, 0.15]$$

We failed in 100 consecutive ReCom attempts, so we will stop here at count = 67.

Original population deviation from ideal = 1005103. Final population deviation = 216166

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.14089608340834422

Original CDI Count Score = 77. Final CDI Count Score = 89

The population of each district is [781757, 720109, 632747, 739037, 725623, 736884, 731796]

The compactness of each district is [0.14182376268435998, 0.12070922190343647, 0.2937922893486334, 0.1715888867146215, 0.10863929958358001, 0.06762669515786605, 0.08209242846591232]

The relative value assigned to the metrics was: Pop: 0.7, Compactness: 0.15, MM: 0, Counties: 0.15

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,005,103	216,166
PP Compactness	1	0.1387466383748516	0.14089608340834422
County-District Intersections	46	77	89

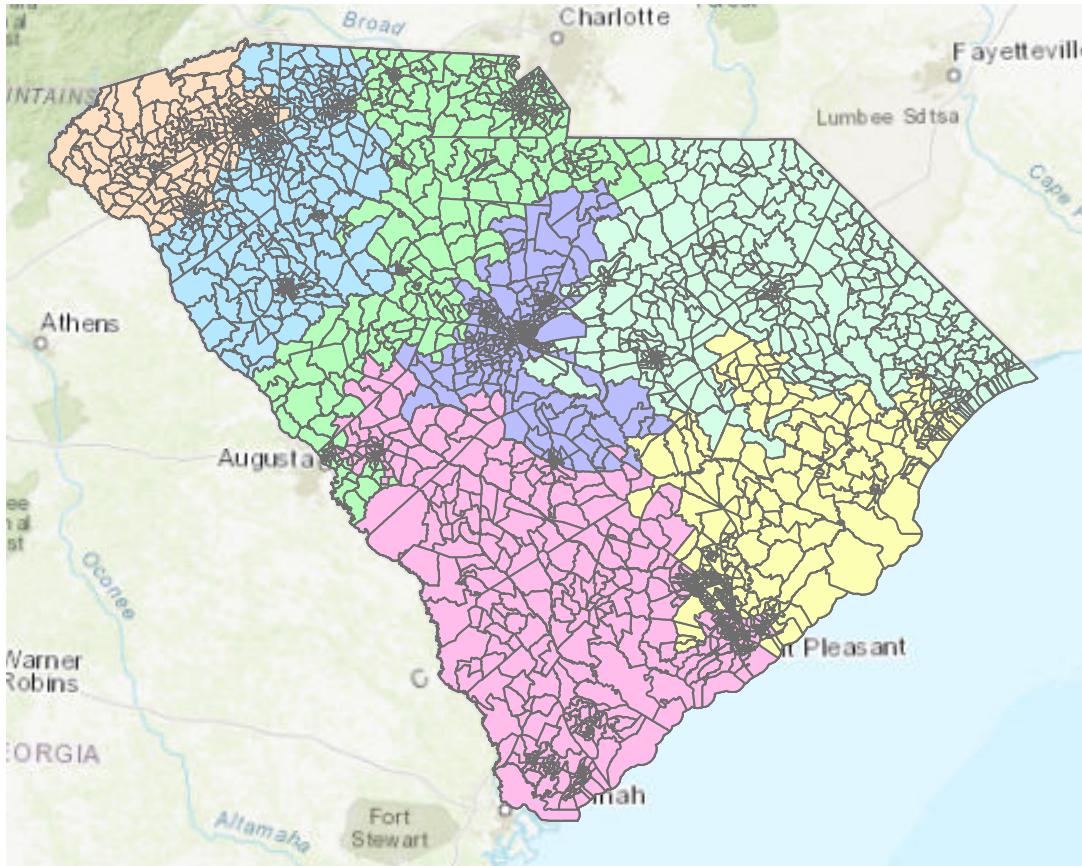


Figure 5: Congressional Map Dominated by Population Constraints while taking into account Compactness and Minimizing County-District Intersections

6 Senate Map Dominated by Population Constraints:

$$\alpha = [1, 0, 0, 0]$$

We failed in 100 consecutive ReCom attempts, so we will stop here at count = 73.

Original population deviation from ideal = 1375892. Final population deviation = 1045255

Original Polsby Popper Compactness = 0.1270699725334312. Final Compactness = 0.1568055425787991

Original CDI Count Score = 169. Final CDI Count Score = 159

The population of each district is [84453, 117993, 91458, 147020, 180753, 113729, 51929, 97233, 163127, 124970, 92303, 77327, 109643, 79266, 106116, 79748, 69431, 108681, 102278, 63843, 128530, 78445, 94116, 116868, 110753, 143456, 89469, 118166, 85412, 140387, 85118, 173781, 102659, 101347, 109893, 128528, 134418, 103854, 101702, 88341, 157115, 115292, 65091, 160743, 115936, 115478] The relative value assigned to the metrics was: Pop: 1, Compactness: 0, MM: 0, Counties: 0

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,375,892	1,045,255
PP Compactness	1	0.1270699725334312	0.1568055425787991
County-District Intersections	46	169	159

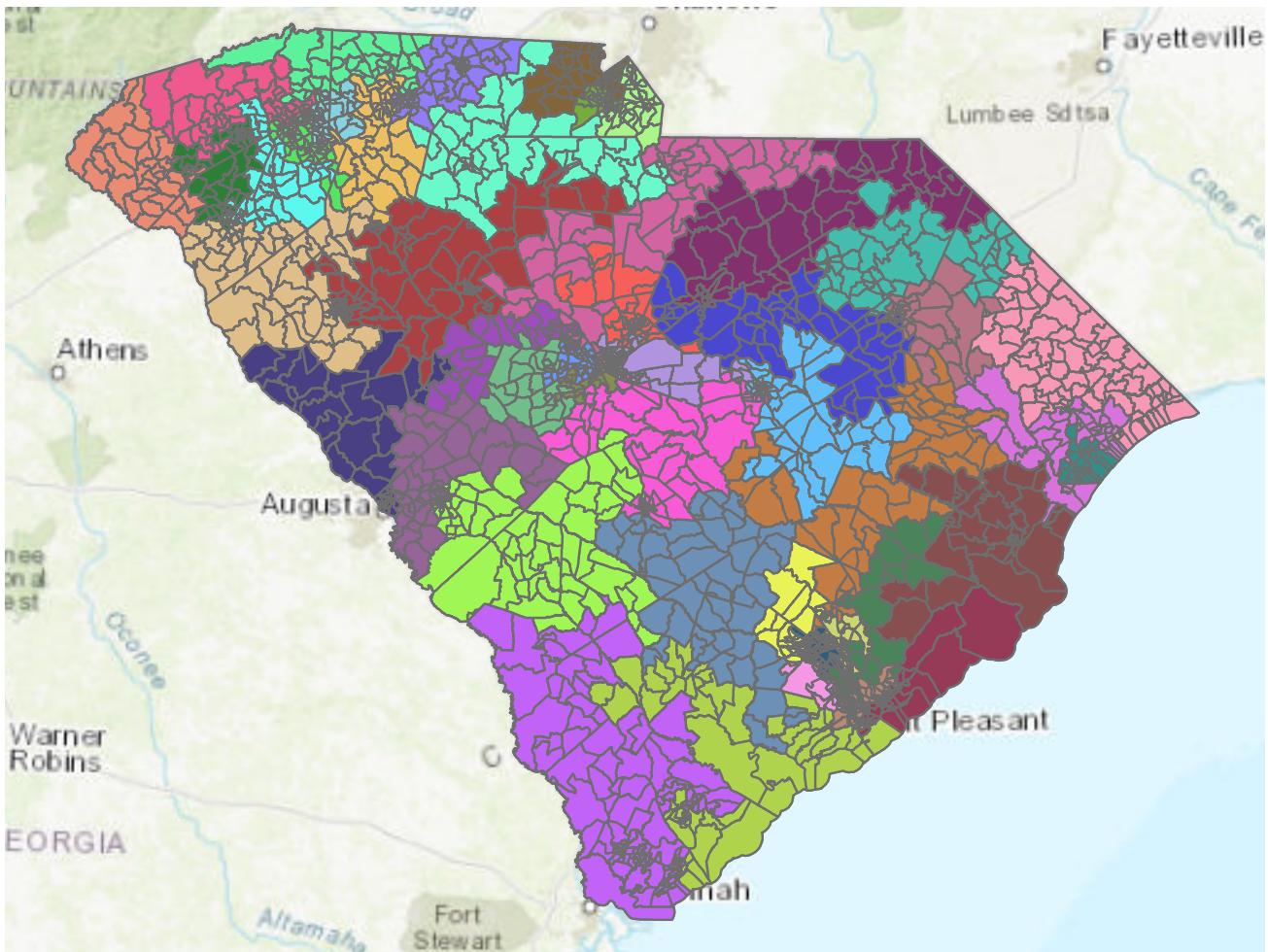


Figure 6: Senate Map Dominated by Population Constraints

7 Senate Map created by all objectives being equal:

$$\alpha = [1/3, 1/3, 0, 1/3]$$

Original population deviation from ideal = 1375892. Final population deviation = 2409408

Original Polsby Popper Compactness = 0.1270699725334312. Final Compactness = 0.16642513639007425

Original CDI Count Score = 169. Final CDI Count Score = 158

The population of each district is [134821, 104332, 115604, 238245, 38441, 208597, 166927, 108560, 200952, 145459, 122576, 99086, 79095, 245119, 109518, 249647, 119897, 41830, 231861, 111256, 79557, 203539, 39368, 164085, 206234, 210462, 233417, 29478, 182022, 119799, 139202, 52601, 141381, 77364, 120365, 88417, 126648, 69310, 72992, 38130, 164384, 87252, 65623, 52847, 132170, 37312]

Metric	Ideal Value	Starting Value	Value at Completion
Population Deviation	0	1,375,892	2,409,408
PP Compactness	1	0.1270699725334312	0.16642513639007425
County-District Intersections	46	169	158

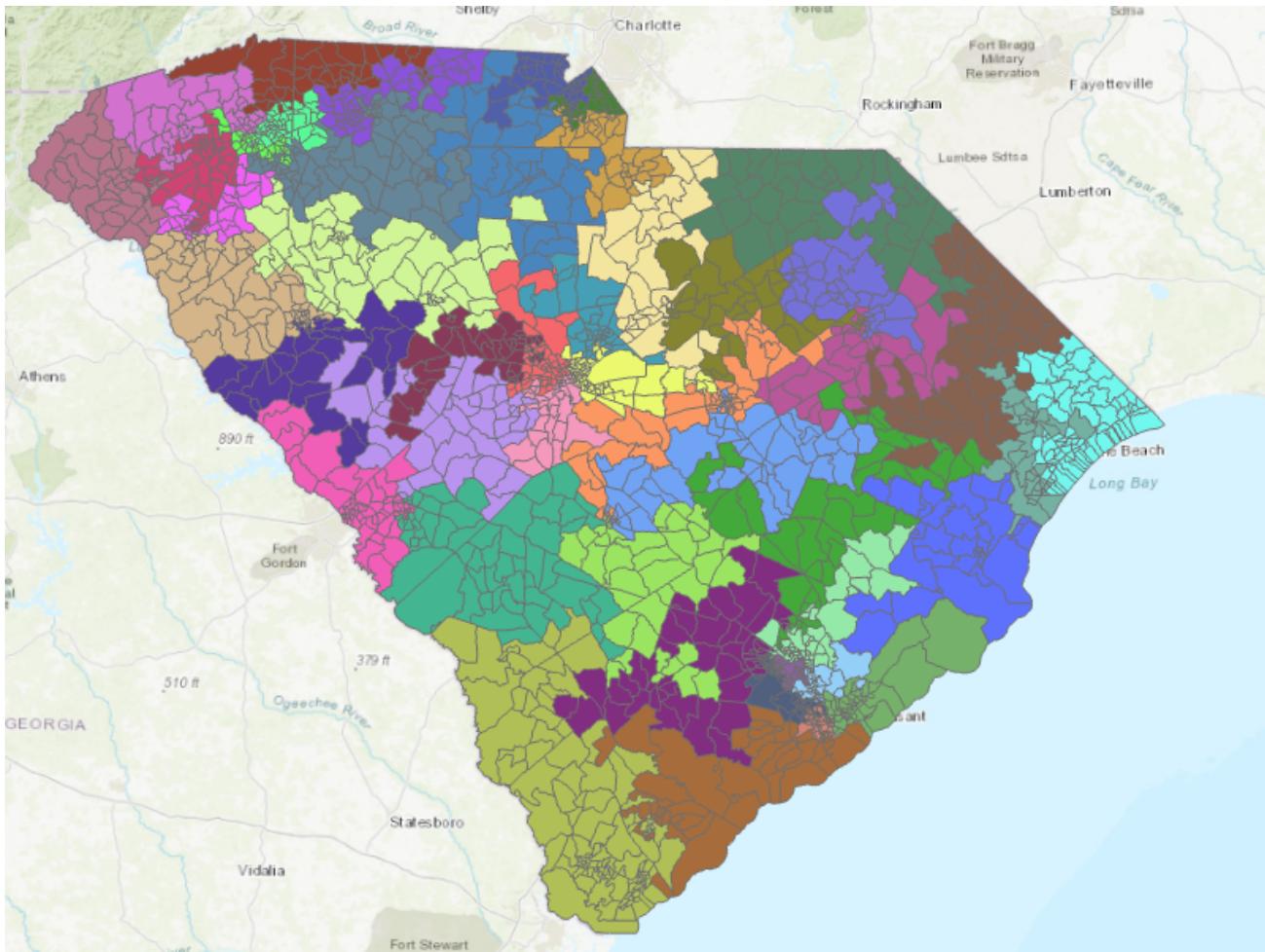


Figure 7: Senate Map created by all objectives being equal