Computer Generated Maps using Multi-Objective Weighting

**Congressional Map Dominated by Population Constraints:**

count = 63. About to add 1.

dist1 = 4 and dist2 = 2.

Running CreateSpanningTree using input from another script

Adjacency Established between districts 4 and 2 by units 1492 and 1717

Subgraph 0 is the new district 4 and subgraph 1 is the new district 2

Updating temp\_dist in CreateSpanningTree.py...

DeltaE\_dev = 122588.

DeltaE\_comp = 0.013257405926269228.

DeltaE\_fair = 0.047619047619047616.

DeltaE\_county = 0.

DeltaE = 2.7119798948728384. T = 0.35510035194045003.

p = 0.0004821664920943358. rand = 0.9052788135677691

The change was rejected, since p < rand.

We failed in 100 consecutive ReCom attempts, so we will stop here.

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

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.13678473563402835

Original Median\_Mean Score = 5.551115123125783e-17. Final Median\_Mean Score = -0.14285714285714285

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

**Congressional Map Dominated by Compactness:**

count = 76. About to add 1.

dist1 = 7 and dist2 = 5.

Running CreateSpanningTree using input from another script

Adjacency Established between districts 7 and 5 by units 371 and 373

Subgraph 0 is the new district 7 and subgraph 1 is the new district 5

Updating temp\_dist in CreateSpanningTree.py...

DeltaE\_dev = -219080.

DeltaE\_comp = 0.054579628267955704.

DeltaE\_fair = 0.14285714285714285.

DeltaE\_county = 2.

DeltaE = 4.142883390250078. T = 0.17832704098331273.

p = 8.13759342155016e-11. rand = 0.5078361109669082

The change was rejected, since p < rand.

We failed in 100 consecutive ReCom attempts, so we will stop here.

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

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.22614455937406028

Original Median\_Mean Score = 5.551115123125783e-17. Final Median\_Mean Score = -0.047619047619047616

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

**Congressional Map Dominated by Minimizing County-District Intersections:**

count = 64. About to add 1.

dist1 = 5 and dist2 = 3.

Running CreateSpanningTree using input from another script

Adjacency Established between districts 5 and 3 by units 102 and 99

Subgraph 0 is the new district 5 and subgraph 1 is the new district 3

Updating temp\_dist in CreateSpanningTree.py...

DeltaE\_dev = 159989.

DeltaE\_comp = -0.0067094154936162.

DeltaE\_fair = -0.047619047619047616.

DeltaE\_county = 6.

DeltaE = 3.75. T = 0.3367757428593853.

p = 1.4592450598382026e-05. rand = 0.24965774856264478

The change was rejected, since p < rand.

We failed in 100 consecutive ReCom attempts, so we will stop here.

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

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.10607810561840798

Original Median\_Mean Score = 5.551115123125783e-17. Final Median\_Mean Score = -0.19047619047619047

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, 0.08238569317860489, 0.12186862894844958, 0.09767762613897546, 0.09535436281642248]

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

**Congressional Map created by all objectives being equal: 𝛼=1/3, 1/3, 0, 1/3**

count = 78. About to add 1.

dist1 = 4 and dist2 = 3.

Running CreateSpanningTree using input from another script

Adjacency Established between districts 4 and 3 by units 133 and 132

Subgraph 0 is the new district 3 and subgraph 1 is the new district 4

Updating temp\_dist in CreateSpanningTree.py...

DeltaE\_dev = 285304.

DeltaE\_comp = -0.0024088025258625634.

DeltaE\_fair = -0.19047619047619047.

DeltaE\_county = 3.

DeltaE = 1.3530079393466037. T = 0.16039713377967083.

p = 0.00021705444763266748. rand = 0.2504932158530149

The change was rejected, since p < rand.

We failed in 100 consecutive ReCom attempts, so we will stop here.

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

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.13859610465963212

Original Median\_Mean Score = 5.551115123125783e-17. Final Median\_Mean Score = -0.19047619047619047

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

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

count = 67. About to add 1.

dist1 = 5 and dist2 = 7.

Running CreateSpanningTree using input from another script

Adjacency Established between districts 5 and 7 by units 411 and 672

Subgraph 0 is the new district 7 and subgraph 1 is the new district 5

Updating temp\_dist in CreateSpanningTree.py...

DeltaE\_dev = 213618.

DeltaE\_comp = 0.0047648282125683505.

DeltaE\_fair = -0.09523809523809523.

DeltaE\_county = -3.

DeltaE = 1.611894454306688. T = 0.2872829838409328.

p = 0.0036580514116696977. rand = 0.027953349757119272

The change was rejected, since p < rand.

We failed in 100 consecutive ReCom attempts, so we will stop here.

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

Original Polsby Popper Compactness = 0.1387466383748516. Final Compactness = 0.14089608340834422

Original Median\_Mean Score = 5.551115123125783e-17. Final Median\_Mean Score = -0.14285714285714285

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

**Senate Map Dominated by Population Constraints:**

count = 73. About to add 1.

dist1 = 20 and dist2 = 17.

Running CreateSpanningTree using input from another script

Adjacency Established between districts 20 and 17 by units 1483 and 1479

Subgraph 0 is the new district 20 and subgraph 1 is the new district 17

Updating temp\_dist in CreateSpanningTree.py...

DeltaE\_dev = 197115.

DeltaE\_comp = -8.787845117291804e-05.

DeltaE\_fair = 0.0.

DeltaE\_county = -1.

DeltaE = 4.384210924328629. T = 0.20904900421225095.

p = 7.796559215484951e-10. rand = 0.6259182419405994

The change was rejected, since p < rand.

We failed in 100 consecutive ReCom attempts, so we will stop here.

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

Original Polsby Popper Compactness = 0.1270699725334312. Final Compactness = 0.1568055425787991

Original Median\_Mean Score = -2.220446049250313e-16. Final Median\_Mean Score = 0.0

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 compactness of each district is [0.18057630206129452, 0.0739376982840762, 0.12230736479953307, 0.12979065213405727, 0.10680744708408847, 0.048863828188659614, 0.141569625897723, 0.16179200970076518, 0.14425299538973532, 0.12348422886692854, 0.14029669903994416, 0.07454386131803377, 0.11372954563531024, 0.12530092592694117, 0.2803325007131606, 0.14762225249169877, 0.12443652361385488, 0.17175490047581224, 0.0656433350535979, 0.11213526669666374, 0.0659682505026267, 0.12812400192640064, 0.21327763671453165, 0.1342083095679378, 0.1982349194490526, 0.1697138716040906, 0.13252797150906653, 0.34088463103023675, 0.2547788389519543, 0.2446812838854533, 0.1573452554149079, 0.20559590932197008, 0.14763195772200566, 0.13289499602475663, 0.14916350100103806, 0.2605762886035027, 0.25877979394017436, 0.27787238076779197, 0.1852186177373191, 0.22423348963401968, 0.052410182137674365, 0.20150651800577252, 0.12586413606847435, 0.16694580049385077, 0.12340555055923338, 0.07203290267903857]

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