

County Cluster Districting Plan for Oklahoma State House*



Austin Buchanan

Assistant Professor

Industrial Engineering & Management

Oklahoma State University

buchanan@okstate.edu

<https://ceat.okstate.edu/iem/people/buchanan-faculty-profile.html>

April 15, 2021

*Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation or Oklahoma State University.

State House Districting Rules

Hard Constraints:

- Need to create 101 districts*
- Each district should be contiguous on the map*
- Each district population should be +/- 2.5% of ideal population*
- Ideal population is 38,939 giving bounds of 37,966 and 39,912*

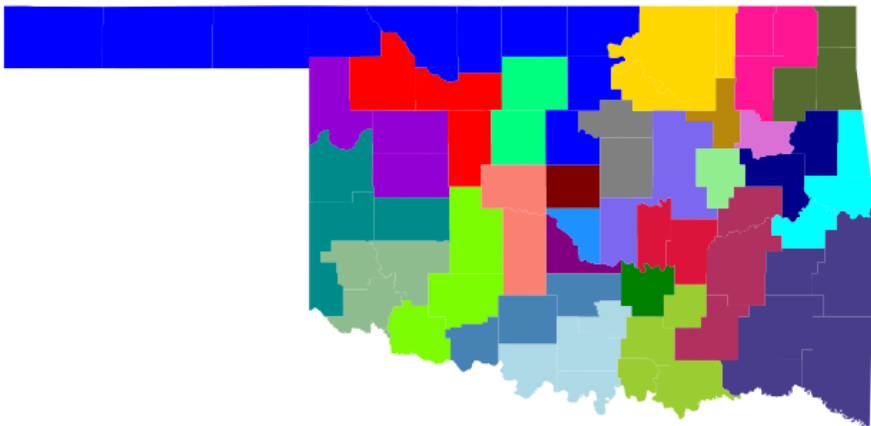
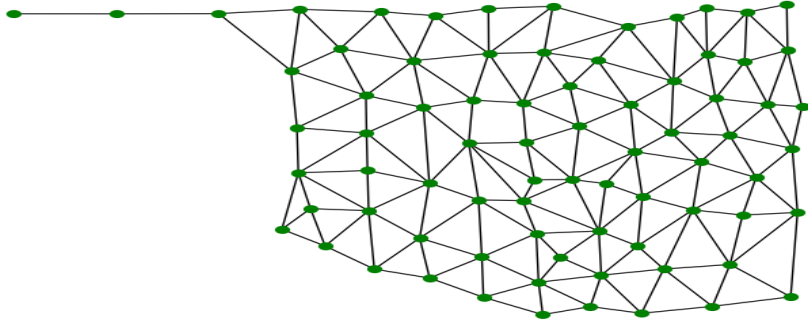
Soft Constraints:

- Compactness
- Preserve subdivisions (e.g., counties*)
- Preserve communities of interest
- ...

This is very hard to do well! Computational difficulty... Local knowledge...Tradeoffs...

*My approach will emphasize these aspects

Step 1: Group Counties into Clusters



Example clusters:

- {Okmulgee} -> 1 district
- {Hughes, Seminole} -> 1 district
- {Oklahoma} -> 20 districts
- {Cotton, Garvin, Stephens} -> 2 districts

Use optimization software to find 28 clusters (see map)

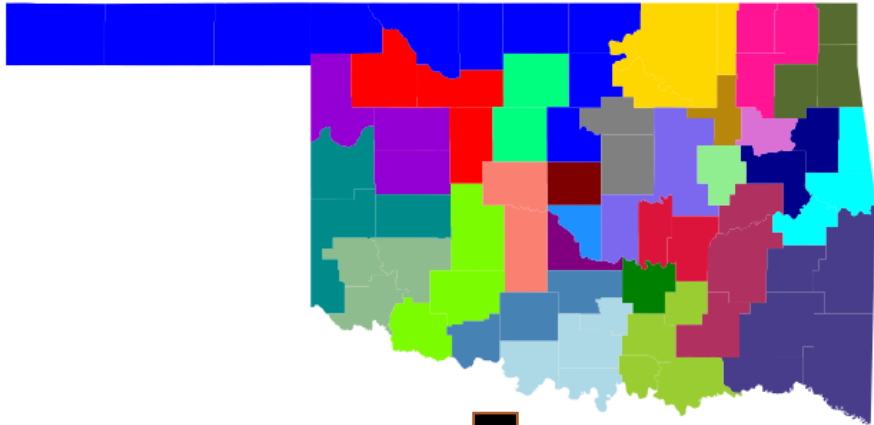
Software requires each cluster to:

- Be contiguous on the map
- Be made of whole counties
- Have population between 37,966 and 39,912, or a multiple thereof
 - Example: Oklahoma County's population of 787,216 is between $20 \times 37,966$ and $20 \times 39,912$

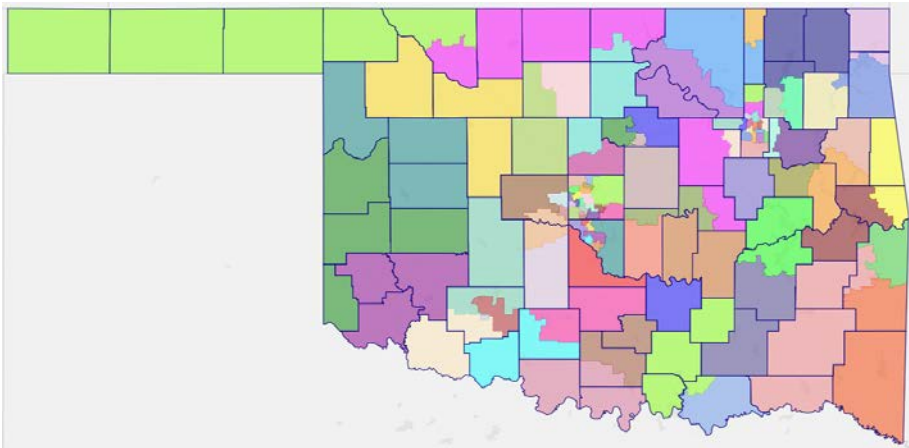
Code here:

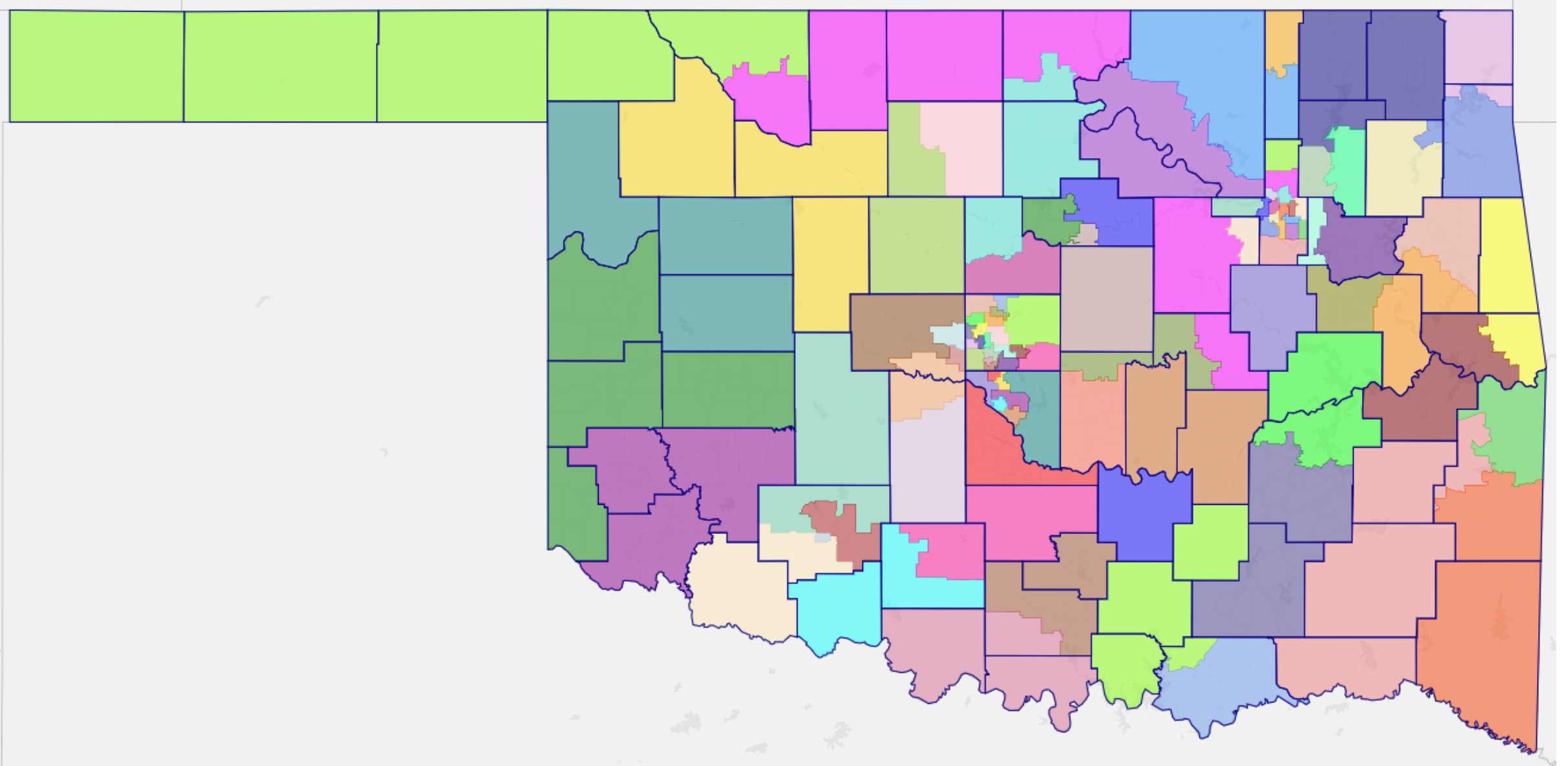
<https://github.com/AustinLBuchanan/OK-County-Clustering>

Step 2: Draw Detailed Plan for Each Cluster



- Now, solve 28 “mini” districting instances
- Easier than solving one big instance
- I drew detailed plans for each cluster “by hand” with Dave’s Redistricting App
- I tried to keep districts compact
- My knowledge of communities of interest is limited!
- Better approach: work with public on step 2

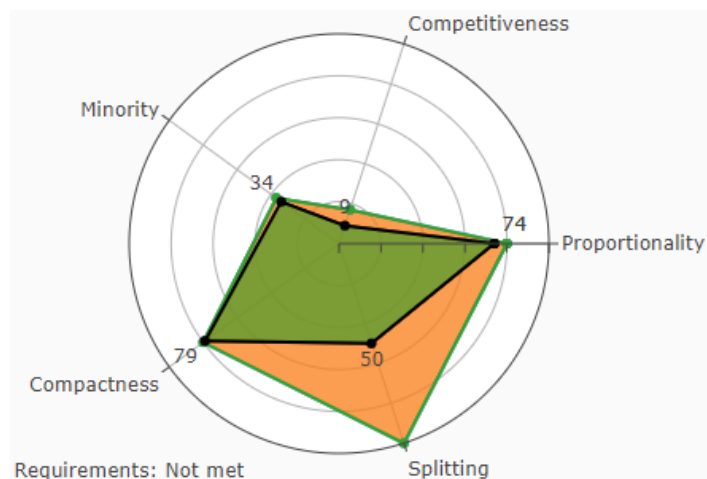




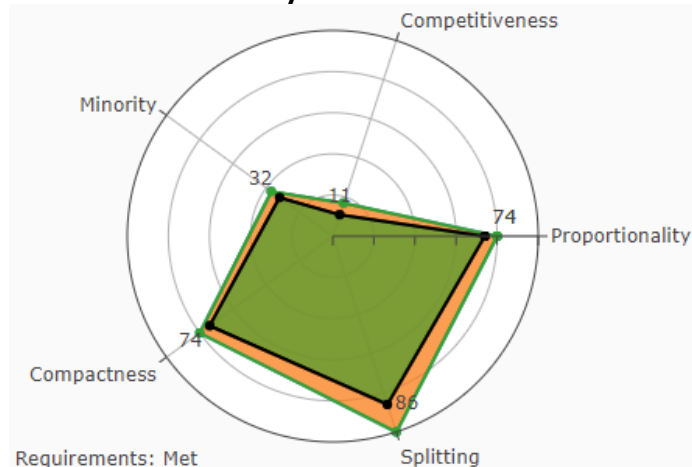
<https://davesredistricting.org/maps#viewmap::d06eedc6-e949-434a-8efc-f948babdcac2>

Comparisons – Strong showing w.r.t. Splitting

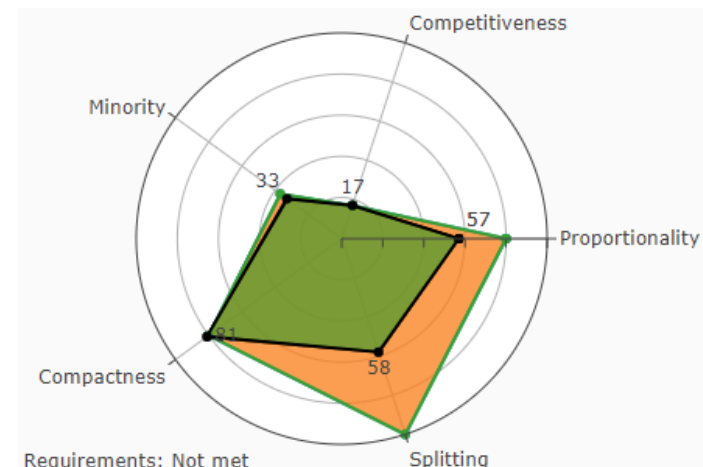
Mark Lawson



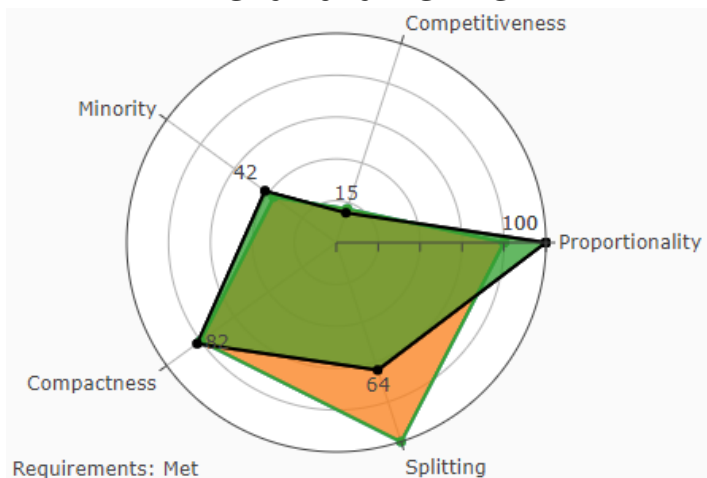
Andy Moore



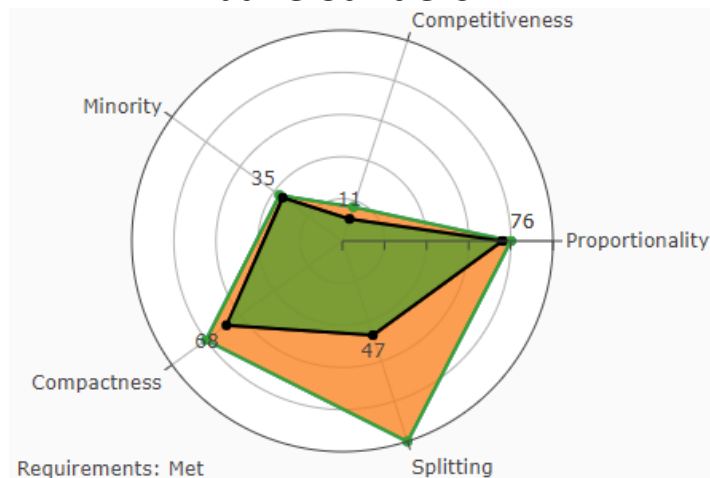
Dan Williams



Alexandra Penner



Julie Sanders



Owen Underwood

