ASSIGNMENT 2: ZONES | DENVER-LAKEWOOD-AURORA MSA

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The Denver-Lakewood-Aurora MSA is home to 2,892,066 residents. Our analysis reveals that the majority of this population surrounds the Downtown Denver Area, as highlighted by the small size of census tracts (which are usually home to 1,000-8,000 residents). The increased square footage of census tracts outside the central area indicates the lessened population density outside the central downtown.

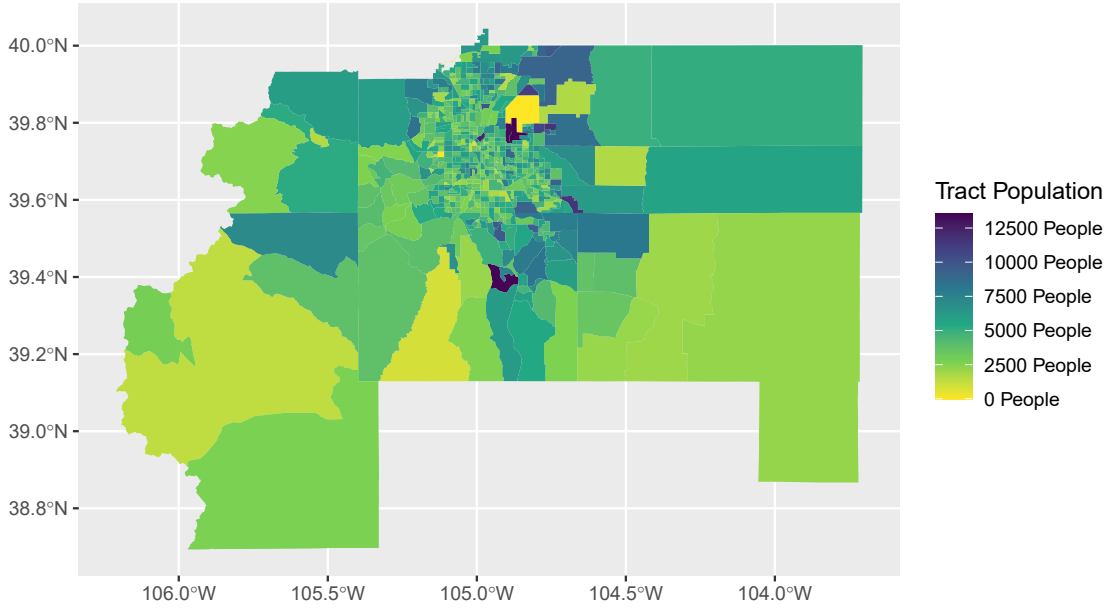

Figure 1: Existing Population per Tract

Our proposal adds households and therefore population to multi-family zones across several jurisdictions. As seen below, this proposal affects some municipalities and tracts within them more than others. Rather than the existing peak population near 12,500, some of these proposed tracts have close to 40,000 residents.

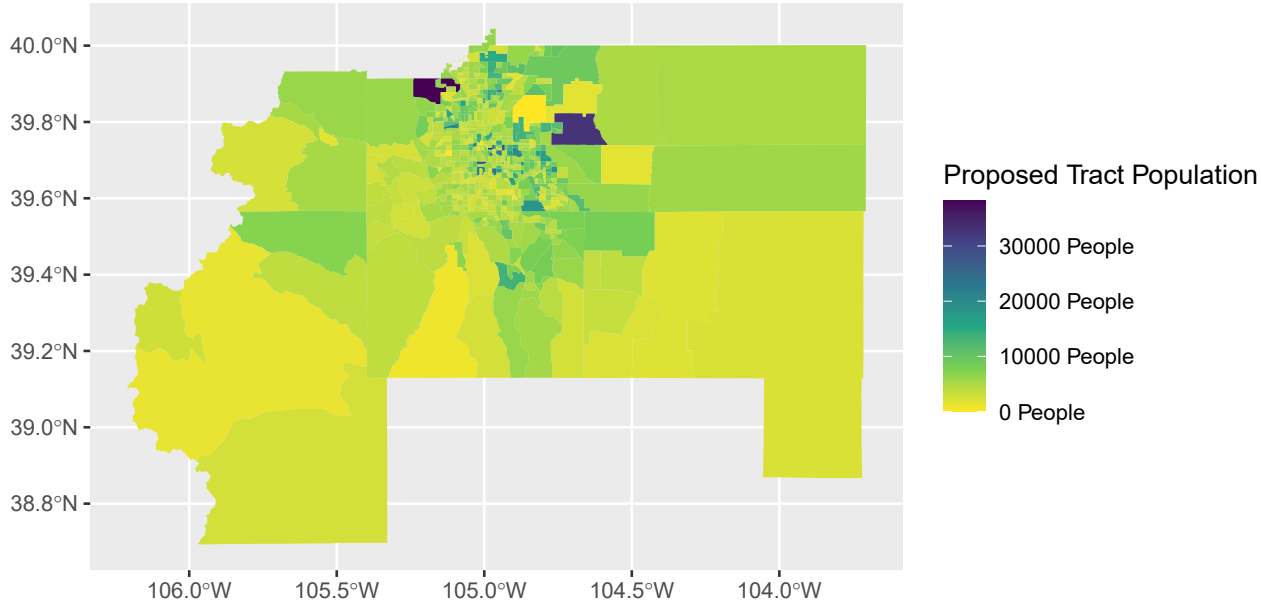

Figure 2: Proposed Population per Tract

The MSA has just over 1,000,000 households. The existing distribution of households aligns with population, where there are high numbers of households in the small tracts near downtown and then a maintenance or decrease of household number for much larger tracts. Here we do see a bigger differentiation between western and eastern suburbs, where western tracts seem to have more households, even if there populations were fairly similar to their eastern counterparts.

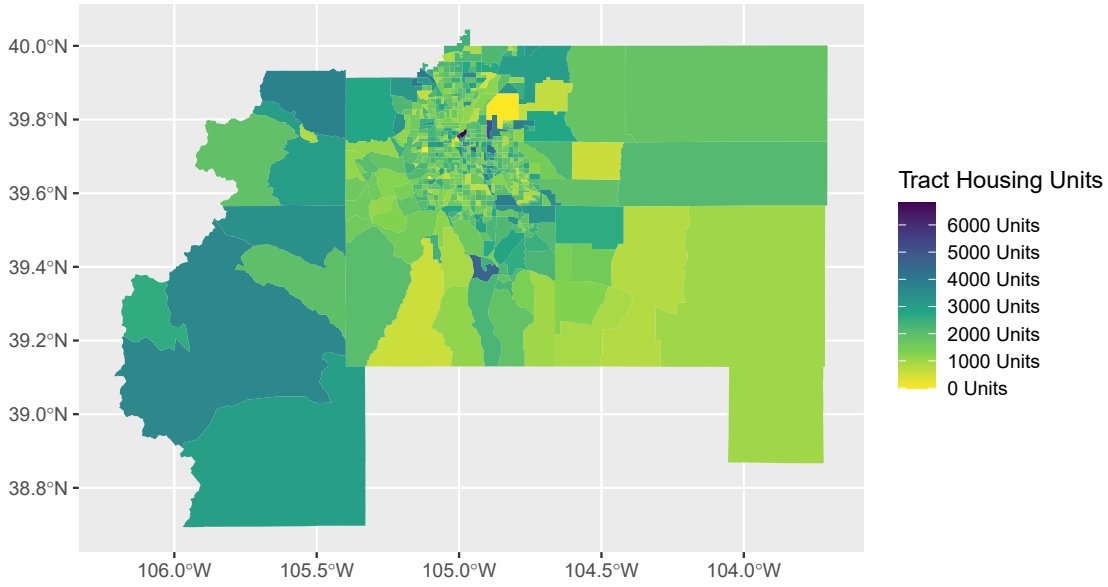

Figure 3: Existing Households per Tract

Our proposal adds a significant number of households, evident through the jump in the legend. Tracts were household dense around 7,000 units in the existing conditions, while now some see upwards of 15,000 units. Similar to the proposed population, these increases are especially apparent in a few tracts.

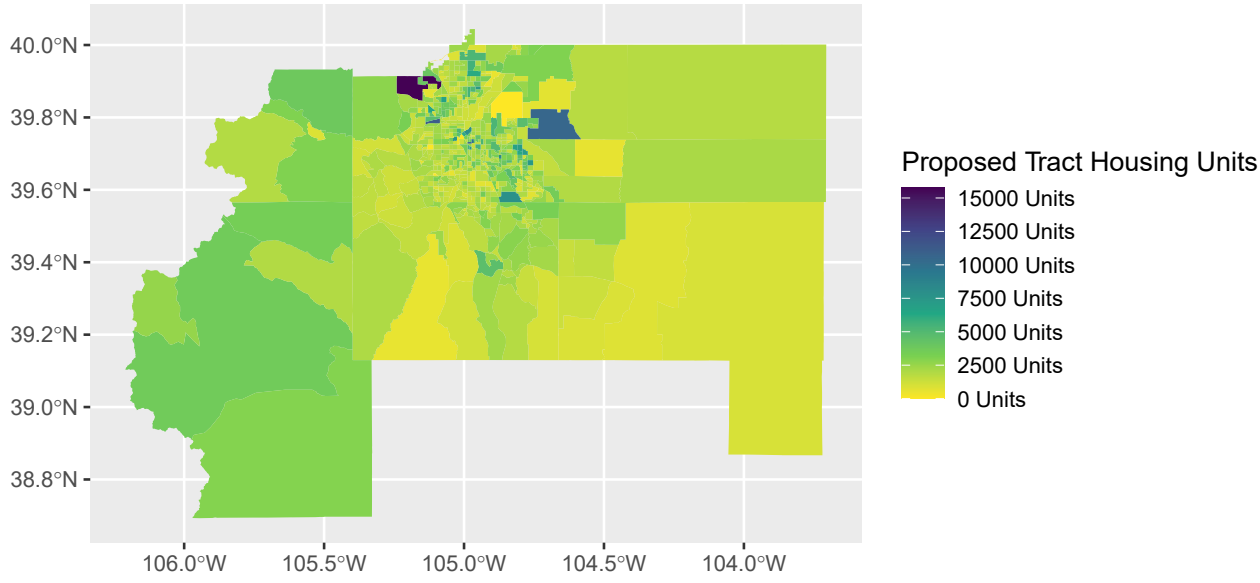

Figure 4: Proposed Households per Tract

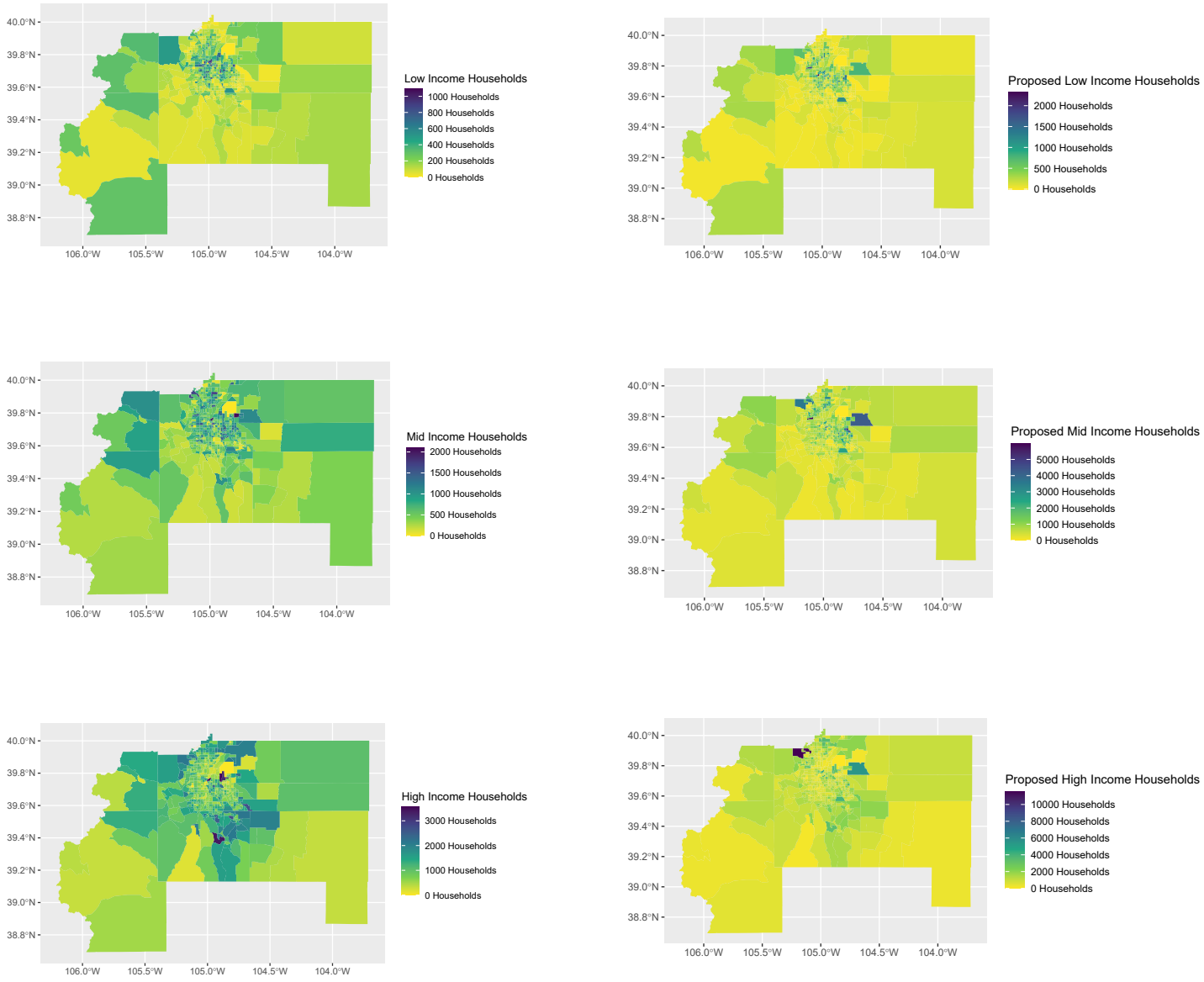

Figure 5: Existing (left) versus Proposed (right) Low, Mid, and High Income Households

The six maps above show low, mid, and high income households across the MSA tracts in existing conditions, the left column, and after our proposal, on the right. The ratios of low to mid to high income households stay the same per our assumptions, so the change in maps reveals the tracts which overlay multi-family zoning, and therefore received household increases.

Unsurprisingly, the majority of households that do not have a vehicle available are near downtown, where street networks are more walkable or bikable, or where there are transportation options available. Even so, zero car households are fairly rare, even in tracts with close to 1000 car-free households, they only make up about 10%.

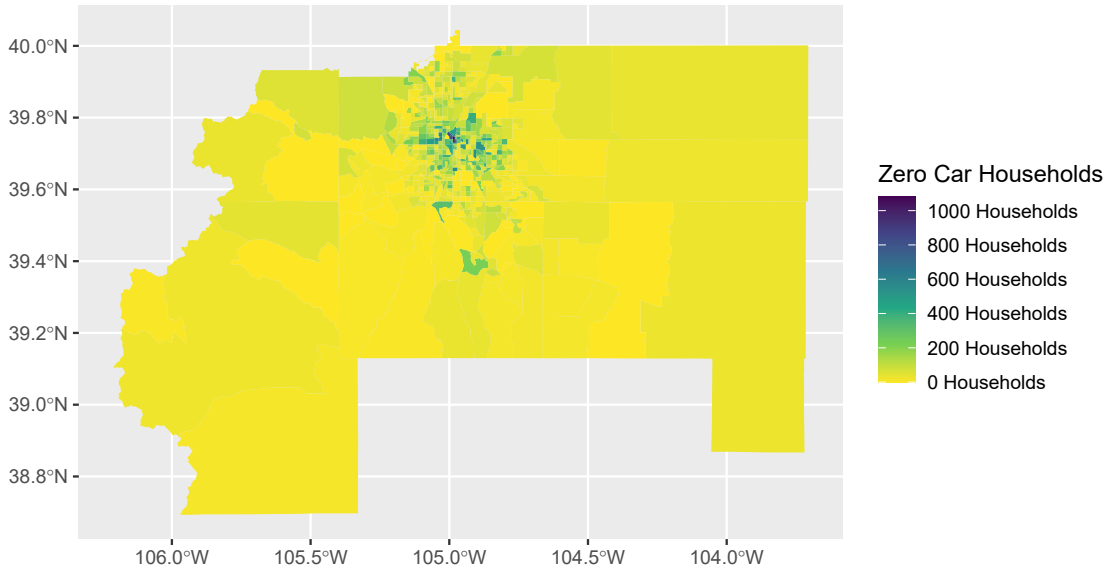

Figure 6: Existing Households with No Vehicles Available

Our proposal maintains the percentage of zero-car to car-available households. Because more central jurisdictions tend to have more multi-family zones, we see the increase in zero-car households in the core of the MSA.

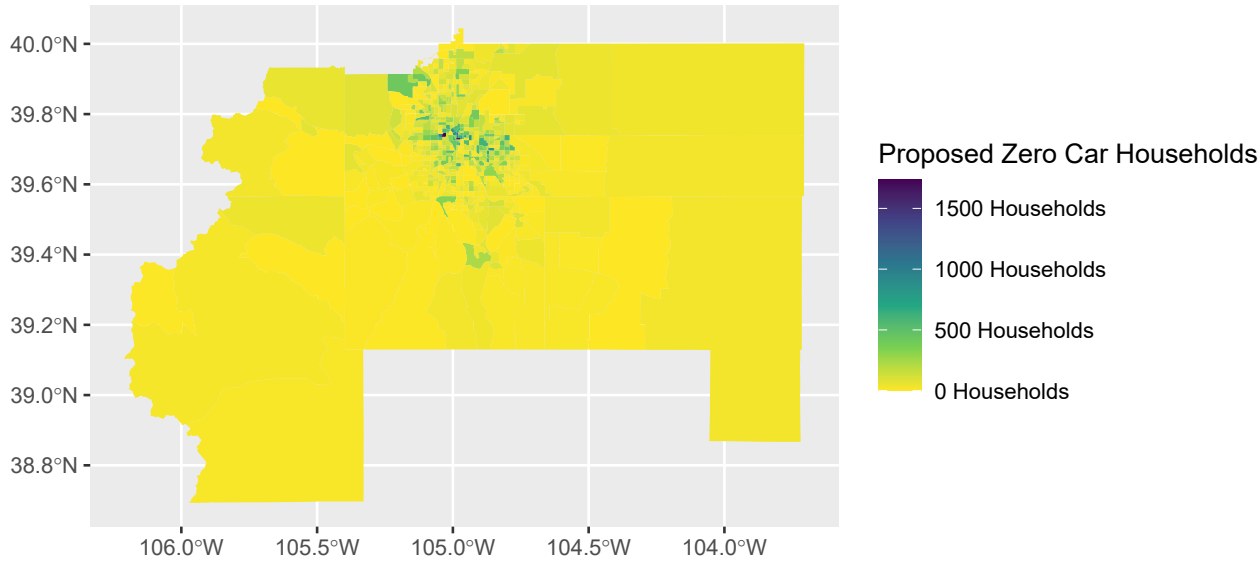

Figure 7: Proposed Households with No Vehicles Available

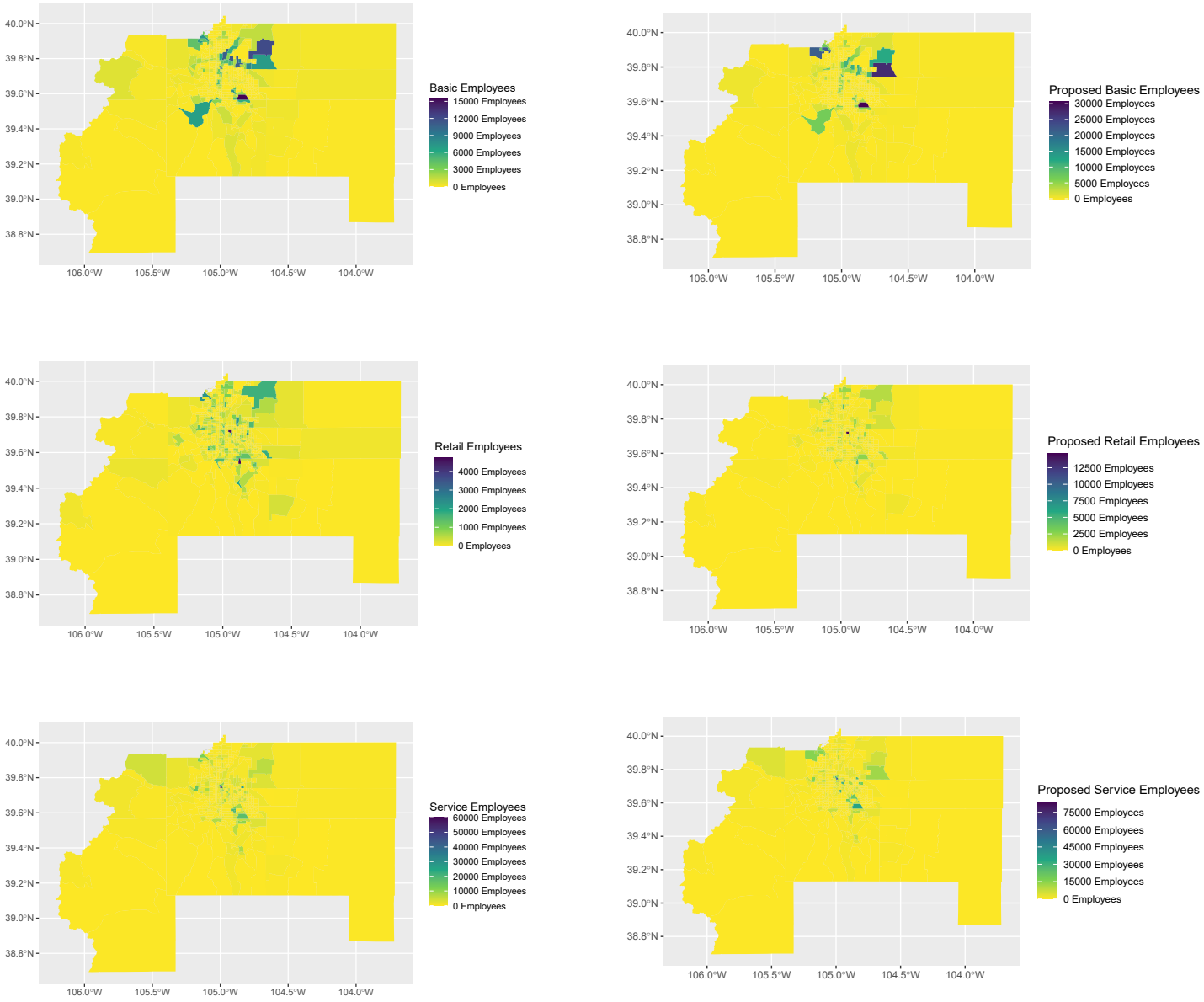

Figure 8: Existing (left) versus Proposed (right) Basic, Retail, and Service Employees.

The six maps above show basic, retail, and service employees across the MSA tracts in existing conditions, the left column, and after our proposal, on the right. The ratios of basic to retail to service employees stay the same per our assumptions, so the change in maps reveals the tracts which overlay multi-family zoning, and therefore received household increases.

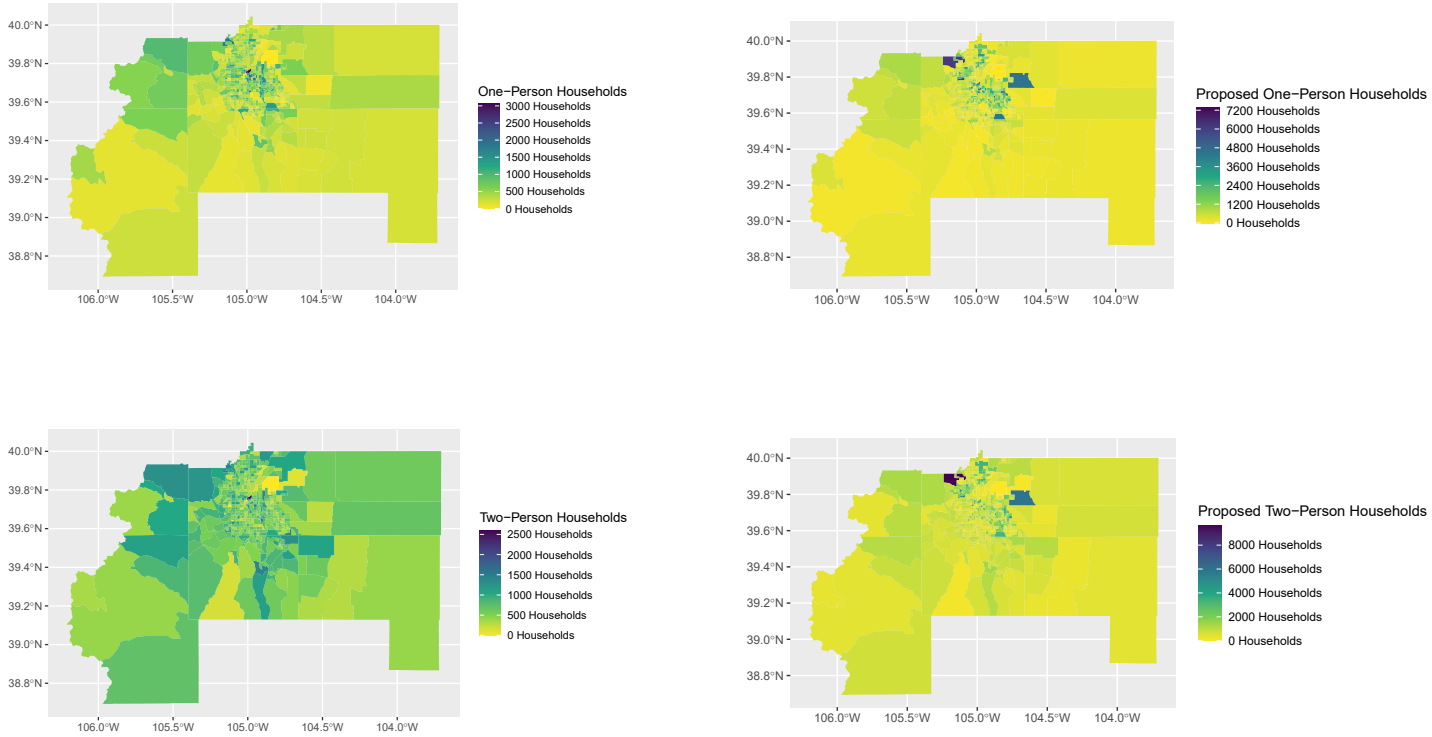

Figure 9: Existing (left) versus Proposed (right) One and Two Person Households

The four maps above show one and two person households across the MSA tracts in existing conditions, the left column, and after our proposal, on the right. The ratios of one and two person households compared to total households stay the same per our assumptions, so the change in maps reveals the tracts which overlay multi-family zoning, and therefore received household increases. Given our proposal is adding solely multi-family units, we chose to designate these households as one or two person only, no larger.

DENVER-LAKEWOOD-AURORA MSA

Existing Conditions Summary of Variables:

Variable <chr>	Average <dbl>	Standard deviation <dbl>	Median <dbl>
basic_emp	623.03871	1638.8601	108.0
hh_income_high	946.97267	524.0082	842.0
hh_income_low	224.30064	184.9907	166.0
hh_income_mid	620.93730	347.1401	574.0
housing_units	1891.84887	802.4370	1812.0
nocar	99.72669	134.5266	50.0
oneperson_hh	506.17846	402.5089	407.0
population	4660.38585	1946.3886	4448.5
retail_emp	244.48871	431.7376	90.5
service_emp	1609.03065	3735.2709	583.0
twoperson_hh	615.06431	272.7655	584.5

11 rows

Proposed Summary of Variables:

Variable <chr>	Average <dbl>	Standard deviation <dbl>	Median <dbl>
new_basic	798.4101	2424.0003	127.2663
new_hh_income_high	1149.3486	836.6467	971.3750
new_hh_income_low	287.2174	288.1387	192.4000
new_hh_income_mid	810.7390	705.2310	610.5000
new_nocar	125.0116	185.1424	57.5000
new_oneperson_hh	820.7401	921.2454	481.5000
new_retail	329.4870	771.9666	115.0492
new_service	2265.3940	5943.0249	654.5000
new_total_housing_units	2315.5785	1520.4037	1997.7050
new_total_tract_population	6112.9770	4447.0253	4978.5000
new_twoperson_hh	948.2001	820.1789	700.0000

11 rows

In addition to spatial comparison, we wanted to pull out some summary statistics for our existing versus proposed conditions. Aside from a useful tool to compare averages before and after, we find it interesting how large the standard deviations are and how different the medians are from the averages. These are likely influenced by the great variation in tract size and zoning type across the MSA.