Population

March 12, 2021

```
[4]: import urllib.request, json
     import pandas as pd
     import geopandas as gpd
     import contextily as ctx
     import matplotlib.pyplot as plt
     import pandas as pd
     import plotly.express as px
     from sodapy import Socrata
```

```
[2]: pop = gpd.read_file('totalpop_acs2019_5yr_B01003_14000US06037432102.geojson')
```

```
[3]: pop.head (5)
```

```
[3]:             geoid                          name    B01003001  \
     0      05000US06037              Los Angeles County, CA  10081570.0
     1  14000US06037101110  Census Tract 1011.10, Los Angeles, CA      4283.0
     2  14000US06037101122  Census Tract 1011.22, Los Angeles, CA      3405.0
     3  14000US06037101210  Census Tract 1012.10, Los Angeles, CA      6347.0
     4  14000US06037101220  Census Tract 1012.20, Los Angeles, CA      3702.0

        B01003001, Error                                    geometry
     0             0.0  MULTIPOLYGON (((-118.70339 34.16859, -118.7033…
     1           443.0  MULTIPOLYGON (((-118.30229 34.25870, -118.3009…
     2           334.0  MULTIPOLYGON (((-118.30334 34.27371, -118.3033…
     3           484.0  MULTIPOLYGON (((-118.29945 34.25598, -118.2979…
     4           276.0  MULTIPOLYGON (((-118.28593 34.25227, -118.2859…
```

```
[ ]:
```

```
[4]: pop = pop.drop([0])
```

```
[5]: columns_to_keep = ['geoid',
                        'name',
                        'B01003001',
                        'geometry']
```

```
[6]: pop = pop [columns_to_keep]
```

```
[7]: pop.columns = ['geoid',
                     'name',
                     'Population',
                     'geometry']
```

```
[8]: pop.head ()
```

```
[8]:              geoid                                  name  Population  \
     1  14000US06037101110  Census Tract 1011.10, Los Angeles, CA      4283.0
     2  14000US06037101122  Census Tract 1011.22, Los Angeles, CA      3405.0
     3  14000US06037101210  Census Tract 1012.10, Los Angeles, CA      6347.0
     4  14000US06037101220  Census Tract 1012.20, Los Angeles, CA      3702.0
     5  14000US06037101300     Census Tract 1013, Los Angeles, CA      3884.0

                                               geometry
     1  MULTIPOLYGON (((-118.30229 34.25870, -118.3009…
     2  MULTIPOLYGON (((-118.30334 34.27371, -118.3033…
     3  MULTIPOLYGON (((-118.29945 34.25598, -118.2979…
     4  MULTIPOLYGON (((-118.28593 34.25227, -118.2859…
     5  MULTIPOLYGON (((-118.27822 34.25068, -118.2782…
```
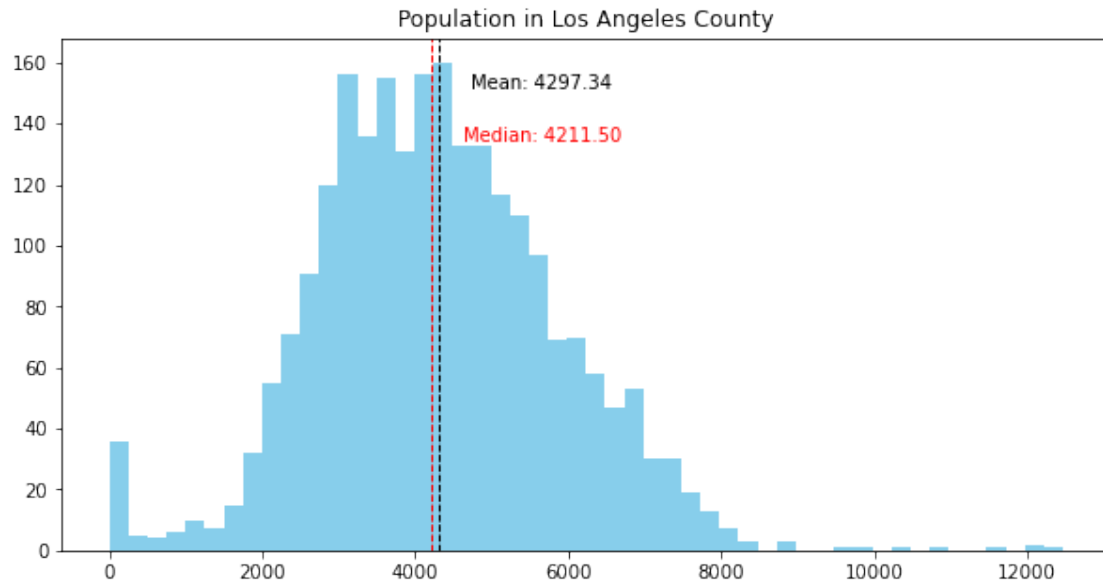
```
[9]: def get_histogram(column = 'Population'):
         series_to_plot=pop[column]

         plt.figure(figsize=(10,5))

         plt.hist(series_to_plot,bins=50,color='skyblue')

         plt.axvline(series_to_plot.mean(), color='k', linestyle='dashed',
      →linewidth=1)
         plt.axvline(series_to_plot.median(), color='r', linestyle='dashed',
      →linewidth=1)
         min_ylim, max_ylim = plt.ylim()
         plt.text(series_to_plot.mean()*1.1, max_ylim*0.9, 'Mean: {:.2f}'.
      →format(series_to_plot.mean()))
         plt.text(series_to_plot.median()*1.1, max_ylim*0.8, 'Median: {:.2f}'.
      →format(series_to_plot.median()),color='r')
         plt.title(column + ' in Los Angeles County')
```

```
[10]: get_histogram ()
```

Population in Los Angeles County

Mean: 4297.34

Median: 4211.50

```
fig, axs = plt.subplots(1, figsize=(30, 30))


ax1 = axs


pop.plot(column='Population',
         cmap='OrRd',
         scheme='equal_interval',
         k=5,
         edgecolor='white',
         linewidth=0.75,
         alpha=0.75,
         ax=ax1,
         legend=True
        )
```

```
[11]: pop['Percent of total pop'] = (pop['Population']/10081570)*100
```

```
[13]: pop.head (50)
```

```
[13]:              geoid                            name  Population  \
      1  14000US06037101110  Census Tract 1011.10, Los Angeles, CA      4283.0
      2  14000US06037101122  Census Tract 1011.22, Los Angeles, CA      3405.0
      3  14000US06037101210  Census Tract 1012.10, Los Angeles, CA      6347.0
      4  14000US06037101220  Census Tract 1012.20, Los Angeles, CA      3702.0
      5  14000US06037101300    Census Tract 1013, Los Angeles, CA      3884.0
```

```
6    14000US06037101400    Census Tract 1014, Los Angeles, CA    3458.0
7    14000US06037102103    Census Tract 1021.03, Los Angeles, CA    1763.0
8    14000US06037102104    Census Tract 1021.04, Los Angeles, CA    3721.0
9    14000US06037102105    Census Tract 1021.05, Los Angeles, CA    1905.0
10    14000US06037102107    Census Tract 1021.07, Los Angeles, CA    4349.0
11    14000US06037103101    Census Tract 1031.01, Los Angeles, CA    2428.0
12    14000US06037103102    Census Tract 1031.02, Los Angeles, CA    4734.0
13    14000US06037103200    Census Tract 1032, Los Angeles, CA    6349.0
14    14000US06037103300    Census Tract 1033, Los Angeles, CA    3781.0
15    14000US06037103400    Census Tract 1034, Los Angeles, CA    6416.0
16    14000US06037104103    Census Tract 1041.03, Los Angeles, CA    3431.0
17    14000US06037104105    Census Tract 1041.05, Los Angeles, CA    6054.0
18    14000US06037104108    Census Tract 1041.08, Los Angeles, CA    6001.0
19    14000US06037104124    Census Tract 1041.24, Los Angeles, CA    3875.0
20    14000US06037104201    Census Tract 1042.01, Los Angeles, CA    4569.0
21    14000US06037104203    Census Tract 1042.03, Los Angeles, CA    5441.0
22    14000US06037104204    Census Tract 1042.04, Los Angeles, CA    3679.0
23    14000US06037104310    Census Tract 1043.10, Los Angeles, CA    4962.0
24    14000US06037104320    Census Tract 1043.20, Los Angeles, CA    5292.0
25    14000US06037104401    Census Tract 1044.01, Los Angeles, CA    3270.0
26    14000US06037104403    Census Tract 1044.03, Los Angeles, CA    3341.0
27    14000US06037104404    Census Tract 1044.04, Los Angeles, CA    3084.0
28    14000US06037104500    Census Tract 1045, Los Angeles, CA    3025.0
29    14000US06037104610    Census Tract 1046.10, Los Angeles, CA    3386.0
30    14000US06037104620    Census Tract 1046.20, Los Angeles, CA    3528.0
31    14000US06037104701    Census Tract 1047.01, Los Angeles, CA    4402.0
32    14000US06037104703    Census Tract 1047.03, Los Angeles, CA    2174.0
33    14000US06037104704    Census Tract 1047.04, Los Angeles, CA    4321.0
34    14000US06037104810    Census Tract 1048.10, Los Angeles, CA    5631.0
35    14000US06037104821    Census Tract 1048.21, Los Angeles, CA    3551.0
36    14000US06037104822    Census Tract 1048.22, Los Angeles, CA    2839.0
37    14000US06037106010    Census Tract 1060.10, Los Angeles, CA    3093.0
38    14000US06037106020    Census Tract 1060.20, Los Angeles, CA    5420.0
39    14000US06037106111    Census Tract 1061.11, Los Angeles, CA    4191.0
40    14000US06037106112    Census Tract 1061.12, Los Angeles, CA    5611.0
41    14000US06037106113    Census Tract 1061.13, Los Angeles, CA    3697.0
42    14000US06037106114    Census Tract 1061.14, Los Angeles, CA    6324.0
43    14000US06037106403    Census Tract 1064.03, Los Angeles, CA    3667.0
44    14000US06037106405    Census Tract 1064.05, Los Angeles, CA    4758.0
45    14000US06037106406    Census Tract 1064.06, Los Angeles, CA    5839.0
46    14000US06037106407    Census Tract 1064.07, Los Angeles, CA    3119.0
47    14000US06037106408    Census Tract 1064.08, Los Angeles, CA    3667.0
48    14000US06037106510    Census Tract 1065.10, Los Angeles, CA    5618.0
49    14000US06037106520    Census Tract 1065.20, Los Angeles, CA    5920.0
50    14000US06037106603    Census Tract 1066.03, Los Angeles, CA    3156.0
```

geometry Percent of total pop

1	MULTIPOLYGON (((-118.30229 34.25870, -118.3009…	0.042483
2	MULTIPOLYGON (((-118.30334 34.27371, -118.3033…	0.033775
3	MULTIPOLYGON (((-118.29945 34.25598, -118.2979…	0.062956
4	MULTIPOLYGON (((-118.28593 34.25227, -118.2859…	0.036720
5	MULTIPOLYGON (((-118.27822 34.25068, -118.2782…	0.038526
6	MULTIPOLYGON (((-118.32238 34.24963, -118.3221…	0.034300
7	MULTIPOLYGON (((-118.36533 34.22870, -118.3639…	0.017487
8	MULTIPOLYGON (((-118.35620 34.21971, -118.3559…	0.036909
9	MULTIPOLYGON (((-118.35307 34.20878, -118.3530…	0.018896
10	MULTIPOLYGON (((-118.36789 34.23939, -118.3678…	0.043138
11	MULTIPOLYGON (((-118.31760 34.27387, -118.3175…	0.024084
12	MULTIPOLYGON (((-118.31575 34.26059, -118.3157…	0.046957
13	MULTIPOLYGON (((-118.37303 34.27425, -118.3730…	0.062976
14	MULTIPOLYGON (((-118.37523 34.25695, -118.3741…	0.037504
15	MULTIPOLYGON (((-118.33000 34.25968, -118.3296…	0.063641
16	MULTIPOLYGON (((-118.40085 34.28159, -118.4006…	0.034032
17	MULTIPOLYGON (((-118.41034 34.27466, -118.4099…	0.060050
18	MULTIPOLYGON (((-118.40853 34.27071, -118.4065…	0.059524
19	MULTIPOLYGON (((-118.39181 34.27762, -118.3916…	0.038436
20	MULTIPOLYGON (((-118.42402 34.28533, -118.4232…	0.045320
21	MULTIPOLYGON (((-118.41799 34.27964, -118.4170…	0.053970
22	MULTIPOLYGON (((-118.41142 34.28443, -118.4085…	0.036492
23	MULTIPOLYGON (((-118.44011 34.26727, -118.4399…	0.049219
24	MULTIPOLYGON (((-118.42876 34.27236, -118.4285…	0.052492
25	MULTIPOLYGON (((-118.44088 34.26705, -118.4401…	0.032435
26	MULTIPOLYGON (((-118.44327 34.26662, -118.4431…	0.033140
27	MULTIPOLYGON (((-118.43527 34.26176, -118.4336…	0.030590
28	MULTIPOLYGON (((-118.43212 34.25878, -118.4313…	0.030005
29	MULTIPOLYGON (((-118.42461 34.26426, -118.4238…	0.033586
30	MULTIPOLYGON (((-118.42801 34.26178, -118.4271…	0.034995
31	MULTIPOLYGON (((-118.42190 34.26624, -118.4213…	0.043664
32	MULTIPOLYGON (((-118.40909 34.25446, -118.4072…	0.021564
33	MULTIPOLYGON (((-118.41818 34.26367, -118.4171…	0.042860
34	MULTIPOLYGON (((-118.41938 34.25224, -118.4177…	0.055854
35	MULTIPOLYGON (((-118.42266 34.24984, -118.4210…	0.035223
36	MULTIPOLYGON (((-118.42860 34.25079, -118.4285…	0.028160
37	MULTIPOLYGON (((-118.45966 34.33002, -118.4589…	0.030680
38	MULTIPOLYGON (((-118.43983 34.31640, -118.4397…	0.053761
39	MULTIPOLYGON (((-118.42134 34.31540, -118.4198…	0.041571
40	MULTIPOLYGON (((-118.42782 34.31545, -118.4263…	0.055656
41	MULTIPOLYGON (((-118.43267 34.31113, -118.4324…	0.036671
42	MULTIPOLYGON (((-118.43676 34.30749, -118.4352…	0.062728
43	MULTIPOLYGON (((-118.44971 34.30759, -118.4481…	0.036373
44	MULTIPOLYGON (((-118.45671 34.31299, -118.4555…	0.047195
45	MULTIPOLYGON (((-118.47073 34.32430, -118.4706…	0.057918
46	MULTIPOLYGON (((-118.44017 34.31027, -118.4396…	0.030938
47	MULTIPOLYGON (((-118.44270 34.31384, -118.4419…	0.036373

```
48   MULTIPOLYGON (((-118.50834 34.33389, -118.5080…          0.055725
49   MULTIPOLYGON (((-118.47301 34.31011, -118.4713…          0.058721
50   MULTIPOLYGON (((-118.54778 34.32689, -118.5477…          0.031305
```
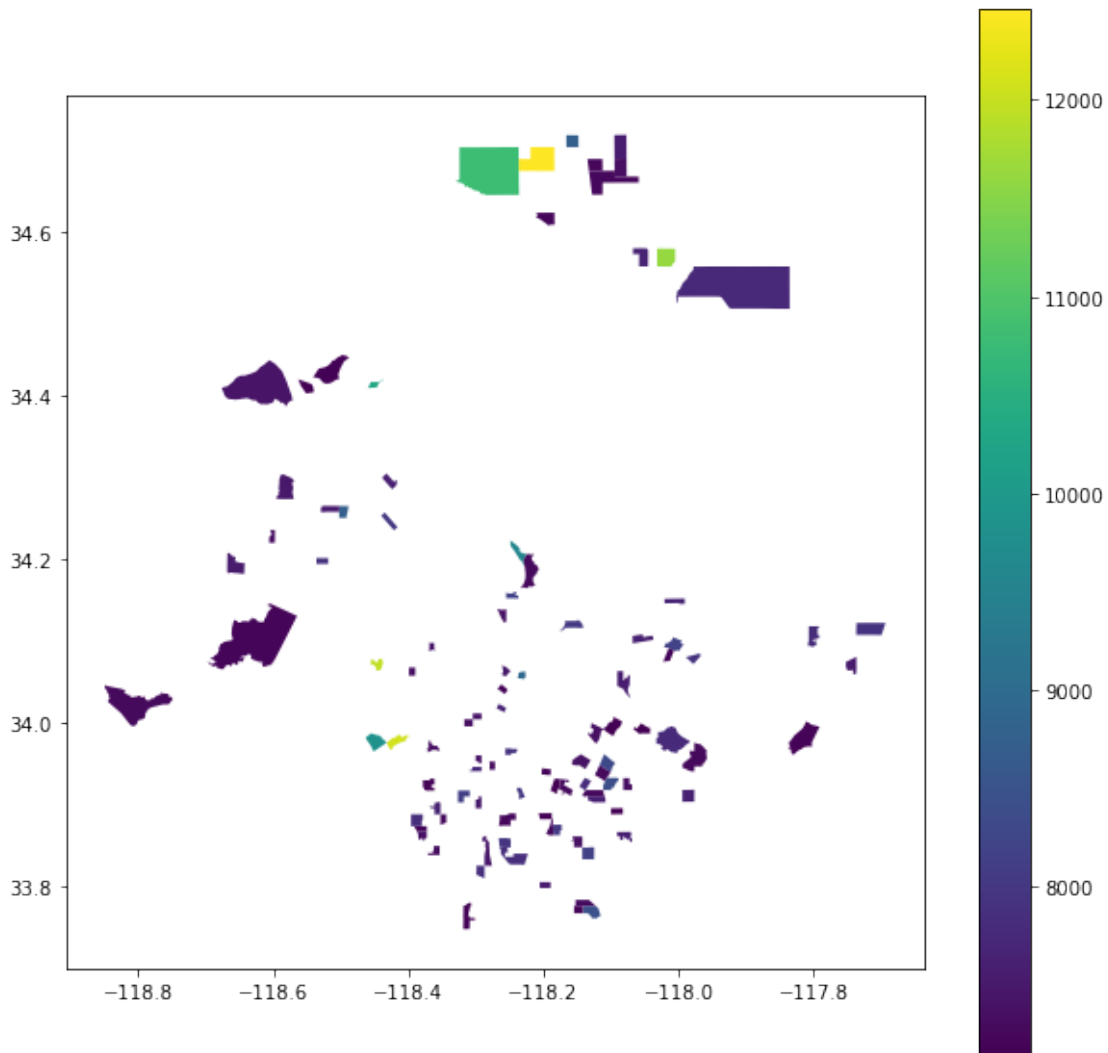
[14]: ```python
pop_sorted = pop.sort_values(by='Population',ascending = False)
```

[ ]: ```python
pop_sorted.head(100)
```

[16]: ```python
pop_sorted.head(100).plot(figsize=(10,10),column='Population',legend=True)
```

[16]: `<matplotlib.axes._subplots.AxesSubplot at 0x7f7a6510e190>`



[17]: ```python
pop_web_mercator = pop.to_crs(epsg=3857)
```
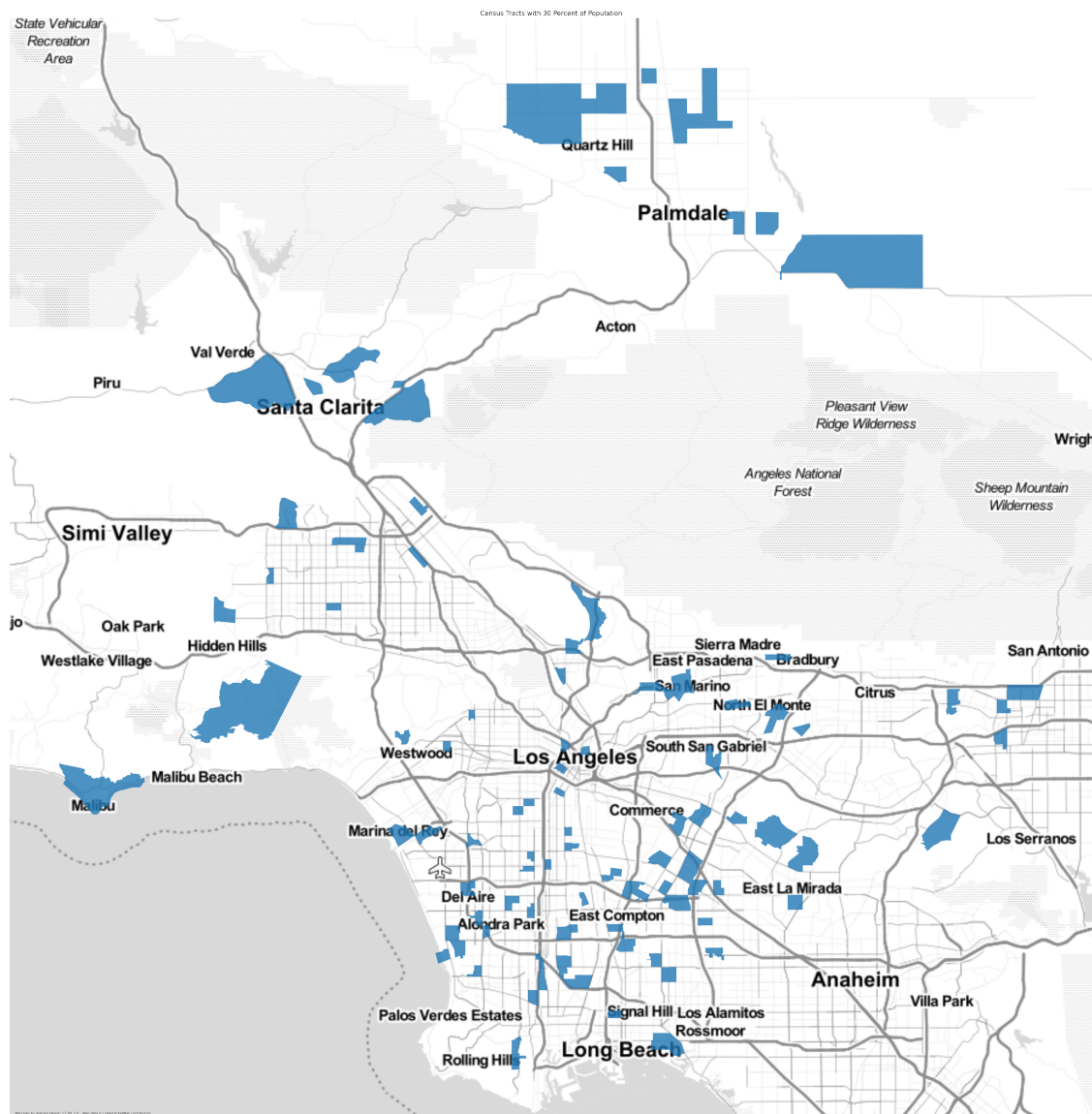
```
[25]: fig, ax = plt.subplots(figsize=(50, 50))

      pop_web_mercator[pop_web_mercator['Percent of total pop'] > 0.07].plot(ax=ax,
       →alpha=0.8)

      ax.axis('off')

      ax.set_title('Census Tracts with 30 Percent of Population',fontsize=16)

      ctx.add_basemap(ax, source=ctx.providers.Stamen.TonerLite)
```

```
[ ]: gdf_cd = gpd.read_file('http://boundaries.latimes.com/1.0/boundary-set/
      ↪la-city-council-districts-2012/?format=geojson')
```

```
[ ]:
```