hw3 with census reporter data

January 31, 2022

This is me trying again to do a map with Census data! After talking with Ryan, I've learnt that there might have been an issue with the Puerto Rico map I had downloaded. Because of that, I will now use data from Census Reporter, as it comes in geoJSON and does not need me to add another map.

[2]:
```
import pandas as pd
```

[3]:
```
# to read and visualize spatial data
import geopandas as gpd

# to provide basemaps
import contextily as ctx

# to give more power to your figures (plots)
import matplotlib.pyplot as plt
```

```
/opt/conda/lib/python3.9/site-packages/geopandas/_compat.py:106: UserWarning:
The Shapely GEOS version (3.9.1-CAPI-1.14.2) is incompatible with the GEOS
version PyGEOS was compiled with (3.10.1-CAPI-1.16.0). Conversions between both
will be slow.
  warnings.warn(
```

[4]:
```
# load a data file
# note the relative filepath! where is this file located?

gdf = gpd.read_file('rent_sanjuan.geojson')
```

[5]:
```
gdf.shape
```

[5]:
```
(2595, 57)
```

[6]:
```
# first five rows, but not all columns?
gdf.head()
```

[6]:

	geoid	name	B25063001	\
0	04000US72	Puerto Rico	380029.0	
1	15000US720019563001	Block Group 1, Adjuntas, PR	167.0	
2	15000US720019563002	Block Group 2, Adjuntas, PR	223.0	

```
3  15000US720019564001  Block Group 1, Adjuntas, PR      239.0
4  15000US720019564002  Block Group 2, Adjuntas, PR      154.0

   B25063001, Error  B25063002  B25063002, Error  B25063003  B25063003, Error  \
0            4032.0   232258.0            3022.0    14006.0             757.0
1              54.0       89.0              62.0        0.0              14.0
2              89.0       94.0              67.0        0.0              14.0
3              94.0      149.0              75.0        0.0              14.0
4              77.0       16.0              27.0        0.0              14.0

   B25063004  B25063004, Error  …  B25063023, Error  B25063024  \
0    11090.0             786.0  …             259.0      435.0
1        0.0              14.0  …              14.0        0.0
2        0.0              14.0  …              14.0        0.0
3        0.0              14.0  …              14.0        0.0
4        0.0              14.0  …              14.0        0.0

   B25063024, Error  B25063025  B25063025, Error  B25063026  B25063026, Error  \
0             163.0      186.0             107.0      171.0              96.0
1              14.0        0.0              14.0        0.0              14.0
2              14.0        0.0              14.0        0.0              14.0
3              14.0        0.0              14.0        0.0              14.0
4              14.0        0.0              14.0        0.0              14.0

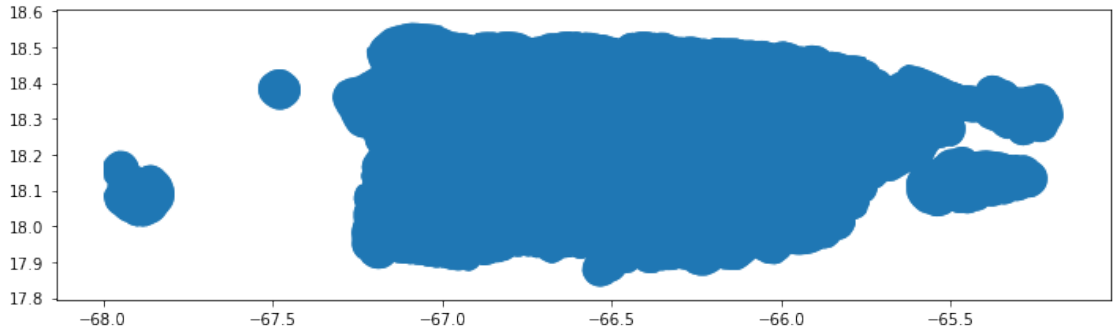
   B25063027  B25063027, Error  \
0   147771.0            2724.0
1       78.0              48.0
2      129.0              56.0
3       90.0              58.0
4      138.0              76.0

                                             geometry
0  MULTIPOLYGON (((-67.20794 18.44228, -67.20844 …
1  MULTIPOLYGON (((-66.75808 18.17672, -66.75776 …
2  MULTIPOLYGON (((-66.79443 18.24988, -66.79381 …
3  MULTIPOLYGON (((-66.83326 18.22802, -66.83275 …
4  MULTIPOLYGON (((-66.83723 18.19298, -66.83685 …

[5 rows x 57 columns]
```

[8]:
```
#Okay, I'm going to plot it now
gdf.plot(figsize=(12,12))
```

[8]: <AxesSubplot:>



#That's so cool! Note: I have also followed Yoh's advice here of using Puerto Rico completely, as opposed of just San Juan

[10]:
```
# This command will let me see all the data
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
```

[11]:
```
gdf.sample()
```

[11]:

	geoid	name	B25063001	B25063001, Error	B25063002	B25063002, Error	B25063003	B25063003, Error	B25063004	B25063004, Error	B25063005	B25063005, Error	B25063006	B25063006, Error	B25063007	B25063007, Error	B25063008	B25063008, Error	B25063009	B25063009, Error	B25063010	B25063010, Error	B25063011	B25063011, Error	B25063012	B25063012, Error	B25063013	B25063013, Error	B25063014	B25063014, Error	B25063015	B25063015, Error	B25063016	B25063016, Error	B25063017
1558	15000US721055204001	Block Group 1, Naranjito, PR	207.0	117.0	110.0	110.0	0.0	14.0	0.0	14.0	0.0	14.0	0.0	14.0	0.0	14.0	0.0	14.0	44.0	68.0	0.0	14.0	52.0	84.0	0.0	14.0	0.0	14.0	0.0	14.0	0.0	14.0	14.0	24.0	0.0

```
      B25063017, Error  B25063018  B25063018, Error  B25063019  \
1558              14.0        0.0              14.0        0.0

      B25063019, Error  B25063020  B25063020, Error  B25063021  \
1558              14.0        0.0              14.0        0.0

      B25063021, Error  B25063022  B25063022, Error  B25063023  \
1558              14.0        0.0              14.0        0.0

      B25063023, Error  B25063024  B25063024, Error  B25063025  \
1558              14.0        0.0              14.0        0.0

      B25063025, Error  B25063026  B25063026, Error  B25063027  \
1558              14.0        0.0              14.0       97.0

      B25063027, Error                                       geometry
1558              78.0  MULTIPOLYGON (((-66.23937 18.29248, -66.23926 …
```

[12]:
```
#data types
gdf.info()
```

```
<class 'geopandas.geodataframe.GeoDataFrame'>
RangeIndex: 2595 entries, 0 to 2594
Data columns (total 57 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   geoid             2595 non-null   object
 1   name              2595 non-null   object
 2   B25063001         2595 non-null   float64
 3   B25063001, Error  2595 non-null   float64
 4   B25063002         2595 non-null   float64
 5   B25063002, Error  2595 non-null   float64
 6   B25063003         2595 non-null   float64
 7   B25063003, Error  2595 non-null   float64
 8   B25063004         2595 non-null   float64
 9   B25063004, Error  2595 non-null   float64
 10  B25063005         2595 non-null   float64
 11  B25063005, Error  2595 non-null   float64
 12  B25063006         2595 non-null   float64
 13  B25063006, Error  2595 non-null   float64
 14  B25063007         2595 non-null   float64
 15  B25063007, Error  2595 non-null   float64
 16  B25063008         2595 non-null   float64
 17  B25063008, Error  2595 non-null   float64
 18  B25063009         2595 non-null   float64
 19  B25063009, Error  2595 non-null   float64
```

```
 20  B25063010          2595 non-null   float64
 21  B25063010, Error   2595 non-null   float64
 22  B25063011          2595 non-null   float64
 23  B25063011, Error   2595 non-null   float64
 24  B25063012          2595 non-null   float64
 25  B25063012, Error   2595 non-null   float64
 26  B25063013          2595 non-null   float64
 27  B25063013, Error   2595 non-null   float64
 28  B25063014          2595 non-null   float64
 29  B25063014, Error   2595 non-null   float64
 30  B25063015          2595 non-null   float64
 31  B25063015, Error   2595 non-null   float64
 32  B25063016          2595 non-null   float64
 33  B25063016, Error   2595 non-null   float64
 34  B25063017          2595 non-null   float64
 35  B25063017, Error   2595 non-null   float64
 36  B25063018          2595 non-null   float64
 37  B25063018, Error   2595 non-null   float64
 38  B25063019          2595 non-null   float64
 39  B25063019, Error   2595 non-null   float64
 40  B25063020          2595 non-null   float64
 41  B25063020, Error   2595 non-null   float64
 42  B25063021          2595 non-null   float64
 43  B25063021, Error   2595 non-null   float64
 44  B25063022          2595 non-null   float64
 45  B25063022, Error   2595 non-null   float64
 46  B25063023          2595 non-null   float64
 47  B25063023, Error   2595 non-null   float64
 48  B25063024          2595 non-null   float64
 49  B25063024, Error   2595 non-null   float64
 50  B25063025          2595 non-null   float64
 51  B25063025, Error   2595 non-null   float64
 52  B25063026          2595 non-null   float64
 53  B25063026, Error   2595 non-null   float64
 54  B25063027          2595 non-null   float64
 55  B25063027, Error   2595 non-null   float64
 56  geometry           2595 non-null   geometry
dtypes: float64(54), geometry(1), object(2)
memory usage: 1.1+ MB
```

[13]:
```
gdf.geoid.head()
```

[13]:
```
0              04000US72
1    15000US720019563001
2    15000US720019563002
3    15000US720019564001
4    15000US720019564002
```

```
Name: geoid, dtype: object
```

[14]:
```
# check the data again
gdf.head()
```

[14]:

	geoid	name	B25063001	\
0	04000US72	Puerto Rico	380029.0	
1	15000US720019563001	Block Group 1, Adjuntas, PR	167.0	
2	15000US720019563002	Block Group 2, Adjuntas, PR	223.0	
3	15000US720019564001	Block Group 1, Adjuntas, PR	239.0	
4	15000US720019564002	Block Group 2, Adjuntas, PR	154.0	

	B25063001, Error	B25063002	B25063002, Error	B25063003	B25063003, Error	\
0	4032.0	232258.0	3022.0	14006.0	757.0	
1	54.0	89.0	62.0	0.0	14.0	
2	89.0	94.0	67.0	0.0	14.0	
3	94.0	149.0	75.0	0.0	14.0	
4	77.0	16.0	27.0	0.0	14.0	

	B25063004	B25063004, Error	B25063005	B25063005, Error	B25063006	\
0	11090.0	786.0	10321.0	737.0	9963.0	
1	0.0	14.0	0.0	14.0	0.0	
2	0.0	14.0	12.0	19.0	0.0	
3	0.0	14.0	0.0	14.0	0.0	
4	0.0	14.0	0.0	14.0	0.0	

	B25063006, Error	B25063007	B25063007, Error	B25063008	B25063008, Error	\
0	650.0	10456.0	671.0	13538.0	734.0	
1	14.0	0.0	14.0	47.0	53.0	
2	14.0	0.0	14.0	21.0	33.0	
3	14.0	0.0	14.0	14.0	23.0	
4	14.0	0.0	14.0	0.0	14.0	

	B25063009	B25063009, Error	B25063010	B25063010, Error	B25063011	\
0	16835.0	1012.0	19097.0	988.0	19252.0	
1	10.0	16.0	0.0	14.0	17.0	
2	15.0	26.0	18.0	30.0	16.0	
3	27.0	44.0	19.0	30.0	33.0	
4	16.0	27.0	0.0	14.0	0.0	

	B25063011, Error	B25063012	B25063012, Error	B25063013	B25063013, Error	\
0	1117.0	16928.0	1016.0	15255.0	863.0	
1	28.0	0.0	14.0	15.0	24.0	
2	25.0	0.0	14.0	0.0	14.0	
3	39.0	13.0	22.0	16.0	26.0	
4	14.0	0.0	14.0	0.0	14.0	

```
   B25063014  B25063014, Error  B25063015  B25063015, Error  B25063016  \
0    12223.0             646.0     9815.0             761.0     9003.0
1        0.0              14.0        0.0              14.0        0.0
2       12.0              19.0        0.0              14.0        0.0
3       27.0              32.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0

   B25063016, Error  B25063017  B25063017, Error  B25063018  B25063018, Error  \
0             710.0     7813.0             697.0    11592.0             811.0
1              14.0        0.0              14.0        0.0              14.0
2              14.0        0.0              14.0        0.0              14.0
3              14.0        0.0              14.0        0.0              14.0
4              14.0        0.0              14.0        0.0              14.0

   B25063019  B25063019, Error  B25063020  B25063020, Error  B25063021  \
0     7684.0             678.0     9298.0             768.0     3711.0
1        0.0              14.0        0.0              14.0        0.0
2        0.0              14.0        0.0              14.0        0.0
3        0.0              14.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0

   B25063021, Error  B25063022  B25063022, Error  B25063023  B25063023, Error  \
0             494.0     2640.0             433.0      946.0             259.0
1              14.0        0.0              14.0        0.0              14.0
2              14.0        0.0              14.0        0.0              14.0
3              14.0        0.0              14.0        0.0              14.0
4              14.0        0.0              14.0        0.0              14.0

   B25063024  B25063024, Error  B25063025  B25063025, Error  B25063026  \
0      435.0             163.0      186.0             107.0      171.0
1        0.0              14.0        0.0              14.0        0.0
2        0.0              14.0        0.0              14.0        0.0
3        0.0              14.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0

   B25063026, Error  B25063027  B25063027, Error  \
0              96.0   147771.0            2724.0
1              14.0       78.0              48.0
2              14.0      129.0              56.0
3              14.0       90.0              58.0
4              14.0      138.0              76.0

                                            geometry
0  MULTIPOLYGON (((-67.20794 18.44228, -67.20844 …
1  MULTIPOLYGON (((-66.75808 18.17672, -66.75776 …
2  MULTIPOLYGON (((-66.79443 18.24988, -66.79381 …
3  MULTIPOLYGON (((-66.83326 18.22802, -66.83275 …
```

```
4  MULTIPOLYGON (((-66.83723 18.19298, -66.83685 …
```

[15]:
```
#Now, we're going to drop things that we don't need
# drop the row with index 0 (i.e. the first row)
gdf = gdf.drop([0])
```

[16]:
```
#checking!
gdf.head()
```

[16]:

```
                geoid                          name  B25063001  \
1  15000US720019563001  Block Group 1, Adjuntas, PR      167.0
2  15000US720019563002  Block Group 2, Adjuntas, PR      223.0
3  15000US720019564001  Block Group 1, Adjuntas, PR      239.0
4  15000US720019564002  Block Group 2, Adjuntas, PR      154.0
5  15000US720019565001  Block Group 1, Adjuntas, PR      198.0

   B25063001, Error  B25063002  B25063002, Error  B25063003  B25063003, Error  \
1              54.0       89.0              62.0        0.0              14.0
2              89.0       94.0              67.0        0.0              14.0
3              94.0      149.0              75.0        0.0              14.0
4              77.0       16.0              27.0        0.0              14.0
5              93.0       88.0              63.0        0.0              14.0

   B25063004  B25063004, Error  B25063005  B25063005, Error  B25063006  \
1        0.0              14.0        0.0              14.0        0.0
2        0.0              14.0       12.0              19.0        0.0
3        0.0              14.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0
5        0.0              14.0        0.0              14.0        0.0

   B25063006, Error  B25063007  B25063007, Error  B25063008  B25063008, Error  \
1              14.0        0.0              14.0       47.0              53.0
2              14.0        0.0              14.0       21.0              33.0
3              14.0        0.0              14.0       14.0              23.0
4              14.0        0.0              14.0        0.0              14.0
5              14.0       28.0              32.0       29.0              46.0

   B25063009  B25063009, Error  B25063010  B25063010, Error  B25063011  \
1       10.0              16.0        0.0              14.0       17.0
2       15.0              26.0       18.0              30.0       16.0
3       27.0              44.0       19.0              30.0       33.0
4       16.0              27.0        0.0              14.0        0.0
5        0.0              14.0       15.0              24.0        0.0

   B25063011, Error  B25063012  B25063012, Error  B25063013  B25063013, Error  \
1              28.0        0.0              14.0       15.0              24.0
2              25.0        0.0              14.0        0.0              14.0
```

```
3             39.0       13.0             22.0       16.0             26.0
4             14.0        0.0             14.0        0.0             14.0
5             14.0       16.0             28.0        0.0             14.0

   B25063014  B25063014, Error  B25063015  B25063015, Error  B25063016  \
1        0.0              14.0        0.0              14.0        0.0
2       12.0              19.0        0.0              14.0        0.0
3       27.0              32.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0
5        0.0              14.0        0.0              14.0        0.0

   B25063016, Error  B25063017  B25063017, Error  B25063018  B25063018, Error  \
1              14.0        0.0              14.0        0.0              14.0
2              14.0        0.0              14.0        0.0              14.0
3              14.0        0.0              14.0        0.0              14.0
4              14.0        0.0              14.0        0.0              14.0
5              14.0        0.0              14.0        0.0              14.0

   B25063019  B25063019, Error  B25063020  B25063020, Error  B25063021  \
1        0.0              14.0        0.0              14.0        0.0
2        0.0              14.0        0.0              14.0        0.0
3        0.0              14.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0
5        0.0              14.0        0.0              14.0        0.0

   B25063021, Error  B25063022  B25063022, Error  B25063023  B25063023, Error  \
1              14.0        0.0              14.0        0.0              14.0
2              14.0        0.0              14.0        0.0              14.0
3              14.0        0.0              14.0        0.0              14.0
4              14.0        0.0              14.0        0.0              14.0
5              14.0        0.0              14.0        0.0              14.0

   B25063024  B25063024, Error  B25063025  B25063025, Error  B25063026  \
1        0.0              14.0        0.0              14.0        0.0
2        0.0              14.0        0.0              14.0        0.0
3        0.0              14.0        0.0              14.0        0.0
4        0.0              14.0        0.0              14.0        0.0
5        0.0              14.0        0.0              14.0        0.0

   B25063026, Error  B25063027  B25063027, Error  \
1              14.0       78.0              48.0
2              14.0      129.0              56.0
3              14.0       90.0              58.0
4              14.0      138.0              76.0
5              14.0      110.0              69.0

                                          geometry
```

```
1  MULTIPOLYGON (((-66.75808 18.17672, -66.75776 …
2  MULTIPOLYGON (((-66.79443 18.24988, -66.79381 …
3  MULTIPOLYGON (((-66.83326 18.22802, -66.83275 …
4  MULTIPOLYGON (((-66.83723 18.19298, -66.83685 …
5  MULTIPOLYGON (((-66.77916 18.15809, -66.77876 …
```

[17]:
```
#good! Now let's take out the things I don't need
# check to see if it has been deleted
list(gdf)
```

[17]:
```
['geoid',
 'name',
 'B25063001',
 'B25063001, Error',
 'B25063002',
 'B25063002, Error',
 'B25063003',
 'B25063003, Error',
 'B25063004',
 'B25063004, Error',
 'B25063005',
 'B25063005, Error',
 'B25063006',
 'B25063006, Error',
 'B25063007',
 'B25063007, Error',
 'B25063008',
 'B25063008, Error',
 'B25063009',
 'B25063009, Error',
 'B25063010',
 'B25063010, Error',
 'B25063011',
 'B25063011, Error',
 'B25063012',
 'B25063012, Error',
 'B25063013',
 'B25063013, Error',
 'B25063014',
 'B25063014, Error',
 'B25063015',
 'B25063015, Error',
 'B25063016',
 'B25063016, Error',
 'B25063017',
 'B25063017, Error',
 'B25063018',
```

```
 'B25063018, Error',
 'B25063019',
 'B25063019, Error',
 'B25063020',
 'B25063020, Error',
 'B25063021',
 'B25063021, Error',
 'B25063022',
 'B25063022, Error',
 'B25063023',
 'B25063023, Error',
 'B25063024',
 'B25063024, Error',
 'B25063025',
 'B25063025, Error',
 'B25063026',
 'B25063026, Error',
 'B25063027',
 'B25063027, Error',
 'geometry']
```

[18]:
```
columns_to_keep = ['geoid',
 'name',
 'B25063001',
 'B25063002',
 'B25063003',
 'B25063004',
 'B25063005',
 'B25063006',
 'B25063007',
 'B25063008',
 'B25063009',
 'B25063010',
 'B25063011',
 'B25063012',
 'B25063013',
 'B25063014',
 'B25063015',
 'B25063016',
 'B25063017',
 'B25063018',
 'B25063019',
 'B25063020',
 'B25063021',
 'B25063022',
 'B25063023',
 'B25063024',
```

```
 'B25063025',
 'B25063026',
 'B25063027',
 'geometry']
```

[19]:
```
# redefine gdf with only columns to keep
gdf = gdf[columns_to_keep]
```

[21]:
```
# check the slimmed down gdf
gdf.head()
```

[21]:

	geoid	name	B25063001	B25063002	\
1	15000US720019563001	Block Group 1, Adjuntas, PR	167.0	89.0	
2	15000US720019563002	Block Group 2, Adjuntas, PR	223.0	94.0	
3	15000US720019564001	Block Group 1, Adjuntas, PR	239.0	149.0	
4	15000US720019564002	Block Group 2, Adjuntas, PR	154.0	16.0	
5	15000US720019565001	Block Group 1, Adjuntas, PR	198.0	88.0	

	B25063003	B25063004	B25063005	B25063006	B25063007	B25063008	\
1	0.0	0.0	0.0	0.0	0.0	47.0	
2	0.0	0.0	12.0	0.0	0.0	21.0	
3	0.0	0.0	0.0	0.0	0.0	14.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	
5	0.0	0.0	0.0	0.0	28.0	29.0	

	B25063009	B25063010	B25063011	B25063012	B25063013	B25063014	\
1	10.0	0.0	17.0	0.0	15.0	0.0	
2	15.0	18.0	16.0	0.0	0.0	12.0	
3	27.0	19.0	33.0	13.0	16.0	27.0	
4	16.0	0.0	0.0	0.0	0.0	0.0	
5	0.0	15.0	0.0	16.0	0.0	0.0	

	B25063015	B25063016	B25063017	B25063018	B25063019	B25063020	\
1	0.0	0.0	0.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	
5	0.0	0.0	0.0	0.0	0.0	0.0	

	B25063021	B25063022	B25063023	B25063024	B25063025	B25063026	\
1	0.0	0.0	0.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	
5	0.0	0.0	0.0	0.0	0.0	0.0	

	B25063027	geometry

```
1       78.0  MULTIPOLYGON (((-66.75808 18.17672, -66.75776 …
2      129.0  MULTIPOLYGON (((-66.79443 18.24988, -66.79381 …
3       90.0  MULTIPOLYGON (((-66.83326 18.22802, -66.83275 …
4      138.0  MULTIPOLYGON (((-66.83723 18.19298, -66.83685 …
5      110.0  MULTIPOLYGON (((-66.77916 18.15809, -66.77876 …
```

[22]:
```
list(gdf)
```

[22]:
```
['geoid',
 'name',
 'B25063001',
 'B25063002',
 'B25063003',
 'B25063004',
 'B25063005',
 'B25063006',
 'B25063007',
 'B25063008',
 'B25063009',
 'B25063010',
 'B25063011',
 'B25063012',
 'B25063013',
 'B25063014',
 'B25063015',
 'B25063016',
 'B25063017',
 'B25063018',
 'B25063019',
 'B25063020',
 'B25063021',
 'B25063022',
 'B25063023',
 'B25063024',
 'B25063025',
 'B25063026',
 'B25063027',
 'geometry']
```

[24]:
```
gdf.columns =['geoid',
'name',
'Total',
'With cash rent',
'Less than $100',
'$100 to $149',
'$150 to $199',
'200 to $249',
```

```
'$250 to $299',
'$300 to $349',
'$350 to $399',
'$400 to $449',
'$450 to $499',
'$500 to $549',
'$550 to $599',
'$600 to $649',
'$650 to $699',
'$700 to $749',
'$750 to $799',
'$800 to $899',
'$900 to $999',
'$1,000 to $1,249',
'$1,250 to $1,499',
'$1,500 to $1,999',
'$2,000 to $2,499',
'$2,500 to $2,999',
'$3,000 to $3,499',
'$3,500 or more',
'No cash rent',
             'geometry']
```

[25]:
```
gdf.head()
```

[25]:
```
                 geoid                          name  Total  With cash rent  \
1  15000US720019563001  Block Group 1, Adjuntas, PR  167.0            89.0
2  15000US720019563002  Block Group 2, Adjuntas, PR  223.0            94.0
3  15000US720019564001  Block Group 1, Adjuntas, PR  239.0           149.0
4  15000US720019564002  Block Group 2, Adjuntas, PR  154.0            16.0
5  15000US720019565001  Block Group 1, Adjuntas, PR  198.0            88.0

   Less than $100  $100 to $149  $150 to $199  200 to $249  $250 to $299  \
1             0.0           0.0           0.0          0.0           0.0
2             0.0           0.0          12.0          0.0           0.0
3             0.0           0.0           0.0          0.0           0.0
4             0.0           0.0           0.0          0.0           0.0
5             0.0           0.0           0.0          0.0          28.0

   $300 to $349  $350 to $399  $400 to $449  $450 to $499  $500 to $549  \
1          47.0          10.0           0.0          17.0           0.0
2          21.0          15.0          18.0          16.0           0.0
3          14.0          27.0          19.0          33.0          13.0
4           0.0          16.0           0.0           0.0           0.0
5          29.0           0.0          15.0           0.0          16.0

   $550 to $599  $600 to $649  $650 to $699  $700 to $749  $750 to $799  \
```

```
1          15.0           0.0           0.0           0.0           0.0
2           0.0          12.0           0.0           0.0           0.0
3          16.0          27.0           0.0           0.0           0.0
4           0.0           0.0           0.0           0.0           0.0
5           0.0           0.0           0.0           0.0           0.0

   $800 to $899  $900 to $999  $1,000 to $1,249  $1,250 to $1,499  \
1           0.0           0.0               0.0               0.0
2           0.0           0.0               0.0               0.0
3           0.0           0.0               0.0               0.0
4           0.0           0.0               0.0               0.0
5           0.0           0.0               0.0               0.0

   $1,500 to $1,999  $2,000 to $2,499  $2,500 to $2,999  $3,000 to $3,499  \
1               0.0               0.0               0.0               0.0
2               0.0               0.0               0.0               0.0
3               0.0               0.0               0.0               0.0
4               0.0               0.0               0.0               0.0
5               0.0               0.0               0.0               0.0

   $3,500 or more  No cash rent  \
1             0.0          78.0
2             0.0         129.0
3             0.0          90.0
4             0.0         138.0
5             0.0         110.0

                                             geometry
1  MULTIPOLYGON (((-66.75808 18.17672, -66.75776 …
2  MULTIPOLYGON (((-66.79443 18.24988, -66.79381 …
3  MULTIPOLYGON (((-66.83326 18.22802, -66.83275 …
4  MULTIPOLYGON (((-66.83723 18.19298, -66.83685 …
5  MULTIPOLYGON (((-66.77916 18.15809, -66.77876 …
```

[26]:
```
# get a random record
random_tract = gdf.sample()
random_tract
```

[26]:
```
                    geoid                          name  Total  With cash rent  \
2027  15000US721270055001  Block Group 1, San Juan, PR  195.0           154.0

      Less than $100  $100 to $149  $150 to $199  200 to $249  $250 to $299  \
2027             0.0           0.0           0.0          0.0          35.0

      $300 to $349  $350 to $399  $400 to $449  $450 to $499  $500 to $549  \
2027           0.0           0.0           0.0          39.0          29.0
```

```
      $550 to $599  $600 to $649  $650 to $699  $700 to $749  $750 to $799  \
2027           0.0           0.0           0.0          51.0           0.0

      $800 to $899  $900 to $999  $1,000 to $1,249  $1,250 to $1,499  \
2027           0.0           0.0               0.0               0.0

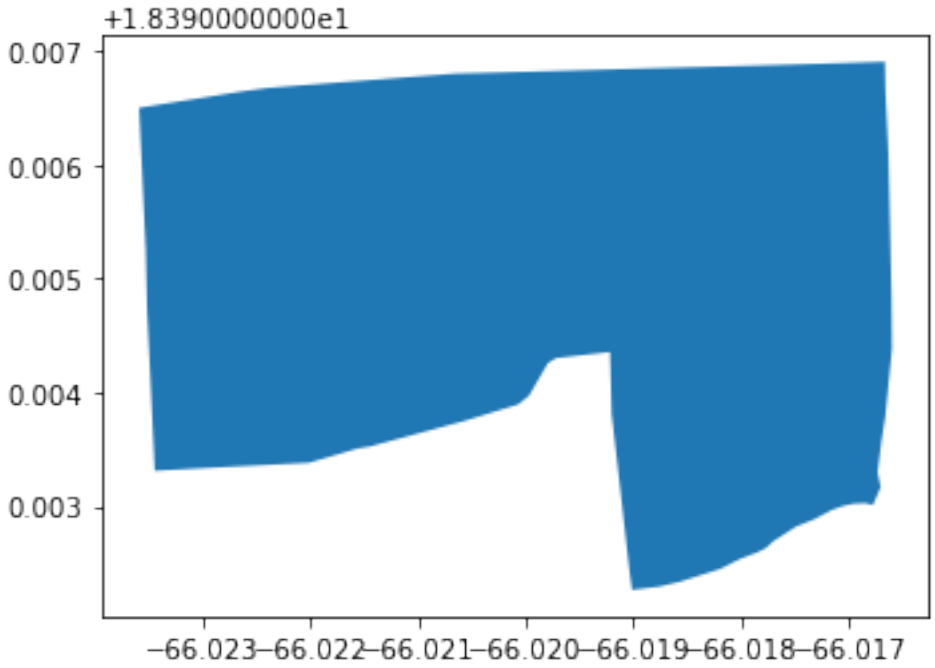
      $1,500 to $1,999  $2,000 to $2,499  $2,500 to $2,999  $3,000 to $3,499  \
2027               0.0               0.0               0.0               0.0

      $3,500 or more  No cash rent  \
2027             0.0          41.0

                                                   geometry
2027  MULTIPOLYGON (((-66.02359 18.39650, -66.02288 …
```

[27]:
```
random_tract.plot()
```

[27]: <AxesSubplot:>



[28]:
```
#Okay, that looks like something. I am not sure yet what it represents, but␣
↪from the gdf it looks like it worked
```

[29]:
```
# example usage of iloc to get the total population of our random record
# "for the 0th record, get the value in the Total column"
random_tract.iloc[0]['Total']
```

[29]: 195.0

[30]:
```
# print this out in plain english
print('Total population: ' + str(random_tract.iloc[0]['Total']))
```

```
Total population: 195.0
```

[31]:
```
# access a single column like df['col_name']
gdf['Total'].head()
```

[31]:
```
1    167.0
2    223.0
3    239.0
4    154.0
5    198.0
Name: Total, dtype: float64
```

[32]:
```
# What is the mean?
gdf['Total'].mean()
```

[32]: 146.50308404009252

[33]:
```
# What is the median?
gdf['Total'].median()
```

[33]: 126.0

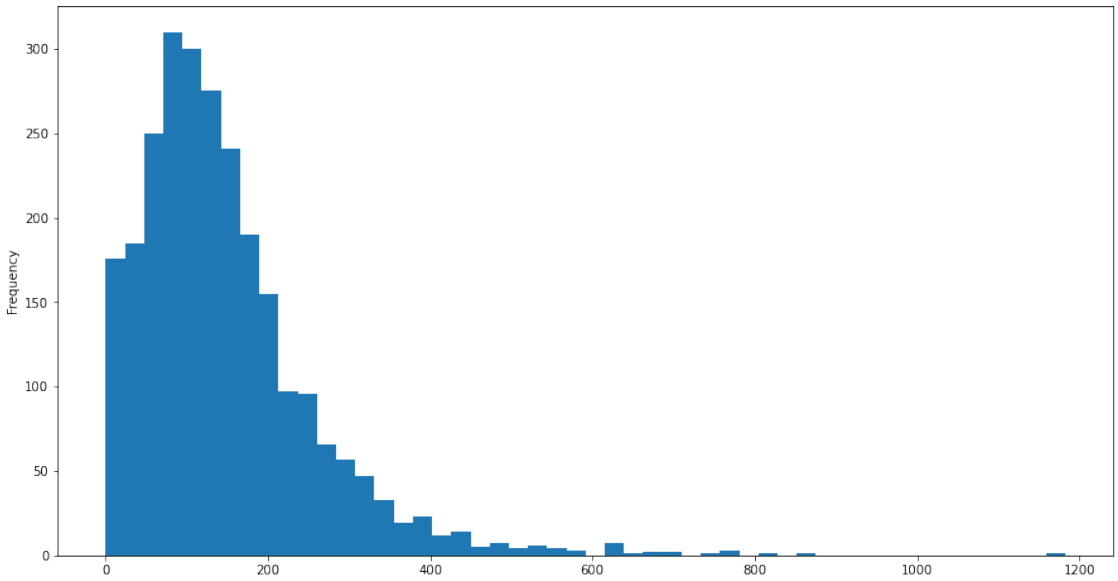
Huh, interesting

[34]:
```
# get some stats
gdf['Total'].describe()
```

[34]:
```
count    2594.000000
mean      146.503084
std       110.231525
min         0.000000
25%        74.000000
50%       126.000000
75%       192.000000
max      1183.000000
Name: Total, dtype: float64
```

[35]:
```
# plot it as a historgram with 50 bins
gdf['Total'].plot.hist(figsize=(15,8),bins=50)
```

[35]: <AxesSubplot:ylabel='Frequency'>



#According to the US Census definition, this "gross rent" variable includes "the contract rent plus the estimated average monthly cost of utilities (electricity, gas, and water and sewer) and fuels (oil, coal, kerosene, wood, etc.". I think the fact people stay on a cheaper side might be indicative of people around the island actually *owing* their houses. It might be worth doing this map for only San Juan, as I expect there to be more rented properties.

[36]:
```
gdf_sorted = gdf.sort_values(by='Total',ascending = False)
```

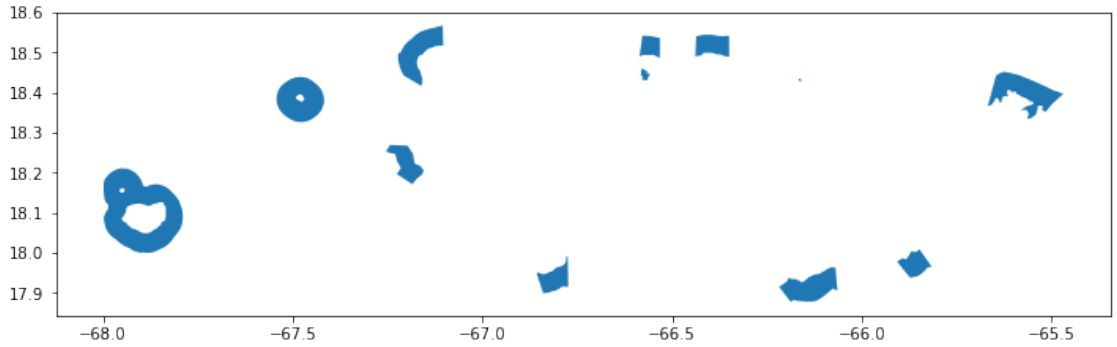
[37]:
```
# display the data, but just a few columns to keep it clean
gdf_sorted[['geoid','Total']].head(10)
```

[37]:

	geoid	Total
2067	15000US721270068001	1183.0
1891	15000US721270013011	864.0
267	15000US720210301032	812.0
1892	15000US721270013021	773.0
688	15000US720310504023	769.0
1495	15000US720970821031	761.0
2184	15000US721270098005	742.0
1894	15000US721270013023	693.0
1944	15000US721270035012	688.0
2046	15000US721270061013	679.0

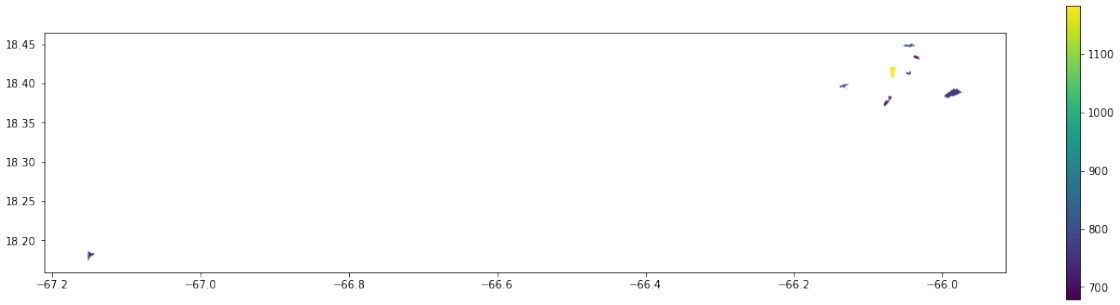
[38]:
```
# plot it
gdf_sorted.tail(10).plot(figsize=(12,12))
```

[38]:
```
<AxesSubplot:>
```



[43]:
```
# Make it prettier
gdf_sorted.head(10).plot(figsize=(20,5),
                         column='Total',
                         legend=True)
```

[43]: <AxesSubplot:>



[44]:
```
# subset the data so that we can see the data per row...
# in other words, this syntax is asking to "show me the values in my dataframe␣
 ↪that match this filter
gdf[gdf['Total']==0]
```

[44]:

	geoid	name	Total	\
18	15000US720034302003	Block Group 3, Aguada, PR	0.0	
41	15000US720039900000	Block Group 0, Aguada, PR	0.0	
86	15000US720059900000	Block Group 0, Aguadilla, PR	0.0	
119	15000US720118101002	Block Group 2, Añasco, PR	0.0	
129	15000US720118105001	Block Group 1, Añasco, PR	0.0	
139	15000US720119900000	Block Group 0, Añasco, PR	0.0	
214	15000US720139929000	Block Group 0, Arecibo, PR	0.0	
219	15000US720152801023	Block Group 3, Arroyo, PR	0.0	
228	15000US720159915000	Block Group 0, Arroyo, PR	0.0	

240	15000US720175903004	Block Group 4, Barceloneta, PR	0.0
245	15000US720179900000	Block Group 0, Barceloneta, PR	0.0
313	15000US720210310314	Block Group 4, Bayamón, PR	0.0
403	15000US720210317043	Block Group 3, Bayamón, PR	0.0
406	15000US720210318002	Block Group 2, Bayamón, PR	0.0
455	15000US720239800001	Block Group 1, Cabo Rojo, PR	0.0
456	15000US720239900000	Block Group 0, Cabo Rojo, PR	0.0
465	15000US720252002004	Block Group 4, Caguas, PR	0.0
471	15000US720252003026	Block Group 6, Caguas, PR	0.0
485	15000US720252005001	Block Group 1, Caguas, PR	0.0
570	15000US720252028003	Block Group 3, Caguas, PR	0.0
592	15000US720279900000	Block Group 0, Camuy, PR	0.0
644	15000US720310502122	Block Group 2, Carolina, PR	0.0
645	15000US720310502123	Block Group 3, Carolina, PR	0.0
731	15000US720310509024	Block Group 4, Carolina, PR	0.0
733	15000US720310510011	Block Group 1, Carolina, PR	0.0
747	15000US720319800031	Block Group 1, Carolina, PR	0.0
748	15000US720319900000	Block Group 0, Carolina, PR	0.0
767	15000US720330205002	Block Group 2, Cataño, PR	0.0
769	15000US720339800011	Block Group 1, Cataño, PR	0.0
770	15000US720339800021	Block Group 1, Cataño, PR	0.0
772	15000US720339800041	Block Group 1, Cataño, PR	0.0
773	15000US720339800051	Block Group 1, Cataño, PR	0.0
774	15000US720339800061	Block Group 1, Cataño, PR	0.0
775	15000US720339800071	Block Group 1, Cataño, PR	0.0
776	15000US720339800081	Block Group 1, Cataño, PR	0.0
777	15000US720339902010	Block Group 0, Cataño, PR	0.0
809	15000US720371601001	Block Group 1, Ceiba, PR	0.0
810	15000US720371601002	Block Group 2, Ceiba, PR	0.0
819	15000US720379900000	Block Group 0, Ceiba, PR	0.0
833	15000US720412401012	Block Group 2, Cidra, PR	0.0
908	15000US720475306001	Block Group 1, Corozal, PR	0.0
914	15000US720499905010	Block Group 0, Culebra, PR	0.0
934	15000US720519900210	Block Group 0, Dorado, PR	0.0
962	15000US720539901030	Block Group 0, Fajardo, PR	0.0
986	15000US720559900000	Block Group 0, Guánica, PR	0.0
988	15000US720572701002	Block Group 2, Guayama, PR	0.0
1013	15000US720572707002	Block Group 2, Guayama, PR	0.0
1019	15000US720579926000	Block Group 0, Guayama, PR	0.0
1035	15000US720599900010	Block Group 0, Guayanilla, PR	0.0
1053	15000US720610403042	Block Group 2, Guaynabo, PR	0.0
1089	15000US720610406026	Block Group 6, Guaynabo, PR	0.0
1107	15000US720632102022	Block Group 2, Gurabo, PR	0.0
1133	15000US720653103003	Block Group 3, Hatillo, PR	0.0
1147	15000US720659900160	Block Group 0, Hatillo, PR	0.0
1195	15000US720699918000	Block Group 0, Humacao, PR	0.0
1222	15000US720719900000	Block Group 0, Isabela, PR	0.0

1265	15000US720759900010	Block Group 0, Juana Díaz, PR	0.0
1305	15000US720799911000	Block Group 0, Lajas, PR	0.0
1370	15000US720879900000	Block Group 0, Loíza, PR	0.0
1385	15000US720899900010	Block Group 0, Luquillo, PR	0.0
1413	15000US720919900250	Block Group 0, Manatí, PR	0.0
1429	15000US720959900000	Block Group 0, Maunabo, PR	0.0
1499	15000US720979900000	Block Group 0, Mayagüez, PR	0.0
1549	15000US721039900130	Block Group 0, Naguabo, PR	0.0
1589	15000US721092902004	Block Group 4, Patillas, PR	0.0
1596	15000US721099900000	Block Group 0, Patillas, PR	0.0
1611	15000US721119900000	Block Group 0, Peñuelas, PR	0.0
1695	15000US721130722026	Block Group 6, Ponce, PR	0.0
1739	15000US721130730081	Block Group 1, Ponce, PR	0.0
1745	15000US721139930000	Block Group 0, Ponce, PR	0.0
1759	15000US721159900000	Block Group 0, Quebradillas, PR	0.0
1770	15000US721179904000	Block Group 0, Rincón, PR	0.0
1773	15000US721191301013	Block Group 3, Río Grande, PR	0.0
1804	15000US721199927000	Block Group 0, Río Grande, PR	0.0
1805	15000US721219603001	Block Group 1, Sabana Grande, PR	0.0
1822	15000US721239526001	Block Group 1, Salinas, PR	0.0
1844	15000US721239928000	Block Group 0, Salinas, PR	0.0
1862	15000US721258406002	Block Group 2, San Germán, PR	0.0
1968	15000US721270044002	Block Group 2, San Juan, PR	0.0
2038	15000US721270058002	Block Group 2, San Juan, PR	0.0
2039	15000US721270058003	Block Group 3, San Juan, PR	0.0
2136	15000US721270086025	Block Group 5, San Juan, PR	0.0
2181	15000US721270098002	Block Group 2, San Juan, PR	0.0
2227	15000US721279801011	Block Group 1, San Juan, PR	0.0
2228	15000US721279801021	Block Group 1, San Juan, PR	0.0
2230	15000US721279801041	Block Group 1, San Juan, PR	0.0
2231	15000US721279801051	Block Group 1, San Juan, PR	0.0
2232	15000US721279801071	Block Group 1, San Juan, PR	0.0
2233	15000US721279801081	Block Group 1, San Juan, PR	0.0
2235	15000US721279803001	Block Group 1, San Juan, PR	0.0
2236	15000US721279900000	Block Group 0, San Juan, PR	0.0
2298	15000US721339900000	Block Group 0, Santa Isabel, PR	0.0
2327	15000US721355106022	Block Group 2, Toa Alta, PR	0.0
2365	15000US721371214003	Block Group 3, Toa Baja, PR	0.0
2369	15000US721371217023	Block Group 3, Toa Baja, PR	0.0
2392	15000US721379900000	Block Group 0, Toa Baja, PR	0.0
2395	15000US721390601023	Block Group 3, Trujillo Alto, PR	0.0
2480	15000US721439900000	Block Group 0, Vega Alta, PR	0.0
2487	15000US721455602042	Block Group 2, Vega Baja, PR	0.0
2505	15000US721455607013	Block Group 3, Vega Baja, PR	0.0
2506	15000US721455607014	Block Group 4, Vega Baja, PR	0.0
2518	15000US721459900000	Block Group 0, Vega Baja, PR	0.0
2525	15000US721479900000	Block Group 0, Vieques, PR	0.0

2566 15000US721519900000 Block Group 0, Yabucoa, PR 0.0

	With cash rent	Less than $100	$100 to $149	$150 to $199	200 to $249	\
18	0.0	0.0	0.0	0.0	0.0	
41	0.0	0.0	0.0	0.0	0.0	
86	0.0	0.0	0.0	0.0	0.0	
119	0.0	0.0	0.0	0.0	0.0	
129	0.0	0.0	0.0	0.0	0.0	
139	0.0	0.0	0.0	0.0	0.0	
214	0.0	0.0	0.0	0.0	0.0	
219	0.0	0.0	0.0	0.0	0.0	
228	0.0	0.0	0.0	0.0	0.0	
240	0.0	0.0	0.0	0.0	0.0	
245	0.0	0.0	0.0	0.0	0.0	
313	0.0	0.0	0.0	0.0	0.0	
403	0.0	0.0	0.0	0.0	0.0	
406	0.0	0.0	0.0	0.0	0.0	
455	0.0	0.0	0.0	0.0	0.0	
456	0.0	0.0	0.0	0.0	0.0	
465	0.0	0.0	0.0	0.0	0.0	
471	0.0	0.0	0.0	0.0	0.0	
485	0.0	0.0	0.0	0.0	0.0	
570	0.0	0.0	0.0	0.0	0.0	
592	0.0	0.0	0.0	0.0	0.0	
644	0.0	0.0	0.0	0.0	0.0	
645	0.0	0.0	0.0	0.0	0.0	
731	0.0	0.0	0.0	0.0	0.0	
733	0.0	0.0	0.0	0.0	0.0	
747	0.0	0.0	0.0	0.0	0.0	
748	0.0	0.0	0.0	0.0	0.0	
767	0.0	0.0	0.0	0.0	0.0	
769	0.0	0.0	0.0	0.0	0.0	
770	0.0	0.0	0.0	0.0	0.0	
772	0.0	0.0	0.0	0.0	0.0	
773	0.0	0.0	0.0	0.0	0.0	
774	0.0	0.0	0.0	0.0	0.0	
775	0.0	0.0	0.0	0.0	0.0	
776	0.0	0.0	0.0	0.0	0.0	
777	0.0	0.0	0.0	0.0	0.0	
809	0.0	0.0	0.0	0.0	0.0	
810	0.0	0.0	0.0	0.0	0.0	
819	0.0	0.0	0.0	0.0	0.0	
833	0.0	0.0	0.0	0.0	0.0	
908	0.0	0.0	0.0	0.0	0.0	
914	0.0	0.0	0.0	0.0	0.0	
934	0.0	0.0	0.0	0.0	0.0	
962	0.0	0.0	0.0	0.0	0.0	

986	0.0	0.0	0.0	0.0	0.0
988	0.0	0.0	0.0	0.0	0.0
1013	0.0	0.0	0.0	0.0	0.0
1019	0.0	0.0	0.0	0.0	0.0
1035	0.0	0.0	0.0	0.0	0.0
1053	0.0	0.0	0.0	0.0	0.0
1089	0.0	0.0	0.0	0.0	0.0
1107	0.0	0.0	0.0	0.0	0.0
1133	0.0	0.0	0.0	0.0	0.0
1147	0.0	0.0	0.0	0.0	0.0
1195	0.0	0.0	0.0	0.0	0.0
1222	0.0	0.0	0.0	0.0	0.0
1265	0.0	0.0	0.0	0.0	0.0
1305	0.0	0.0	0.0	0.0	0.0
1370	0.0	0.0	0.0	0.0	0.0
1385	0.0	0.0	0.0	0.0	0.0
1413	0.0	0.0	0.0	0.0	0.0
1429	0.0	0.0	0.0	0.0	0.0
1499	0.0	0.0	0.0	0.0	0.0
1549	0.0	0.0	0.0	0.0	0.0
1589	0.0	0.0	0.0	0.0	0.0
1596	0.0	0.0	0.0	0.0	0.0
1611	0.0	0.0	0.0	0.0	0.0
1695	0.0	0.0	0.0	0.0	0.0
1739	0.0	0.0	0.0	0.0	0.0
1745	0.0	0.0	0.0	0.0	0.0
1759	0.0	0.0	0.0	0.0	0.0
1770	0.0	0.0	0.0	0.0	0.0
1773	0.0	0.0	0.0	0.0	0.0
1804	0.0	0.0	0.0	0.0	0.0
1805	0.0	0.0	0.0	0.0	0.0
1822	0.0	0.0	0.0	0.0	0.0
1844	0.0	0.0	0.0	0.0	0.0
1862	0.0	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0	0.0
2136	0.0	0.0	0.0	0.0	0.0
2181	0.0	0.0	0.0	0.0	0.0
2227	0.0	0.0	0.0	0.0	0.0
2228	0.0	0.0	0.0	0.0	0.0
2230	0.0	0.0	0.0	0.0	0.0
2231	0.0	0.0	0.0	0.0	0.0
2232	0.0	0.0	0.0	0.0	0.0
2233	0.0	0.0	0.0	0.0	0.0
2235	0.0	0.0	0.0	0.0	0.0
2236	0.0	0.0	0.0	0.0	0.0

2298	0.0	0.0	0.0	0.0	0.0
2327	0.0	0.0	0.0	0.0	0.0
2365	0.0	0.0	0.0	0.0	0.0
2369	0.0	0.0	0.0	0.0	0.0
2392	0.0	0.0	0.0	0.0	0.0
2395	0.0	0.0	0.0	0.0	0.0
2480	0.0	0.0	0.0	0.0	0.0
2487	0.0	0.0	0.0	0.0	0.0
2505	0.0	0.0	0.0	0.0	0.0
2506	0.0	0.0	0.0	0.0	0.0
2518	0.0	0.0	0.0	0.0	0.0
2525	0.0	0.0	0.0	0.0	0.0
2566	0.0	0.0	0.0	0.0	0.0

	$250 to $299	$300 to $349	$350 to $399	$400 to $449	$450 to $499	\
18	0.0	0.0	0.0	0.0	0.0	
41	0.0	0.0	0.0	0.0	0.0	
86	0.0	0.0	0.0	0.0	0.0	
119	0.0	0.0	0.0	0.0	0.0	
129	0.0	0.0	0.0	0.0	0.0	
139	0.0	0.0	0.0	0.0	0.0	
214	0.0	0.0	0.0	0.0	0.0	
219	0.0	0.0	0.0	0.0	0.0	
228	0.0	0.0	0.0	0.0	0.0	
240	0.0	0.0	0.0	0.0	0.0	
245	0.0	0.0	0.0	0.0	0.0	
313	0.0	0.0	0.0	0.0	0.0	
403	0.0	0.0	0.0	0.0	0.0	
406	0.0	0.0	0.0	0.0	0.0	
455	0.0	0.0	0.0	0.0	0.0	
456	0.0	0.0	0.0	0.0	0.0	
465	0.0	0.0	0.0	0.0	0.0	
471	0.0	0.0	0.0	0.0	0.0	
485	0.0	0.0	0.0	0.0	0.0	
570	0.0	0.0	0.0	0.0	0.0	
592	0.0	0.0	0.0	0.0	0.0	
644	0.0	0.0	0.0	0.0	0.0	
645	0.0	0.0	0.0	0.0	0.0	
731	0.0	0.0	0.0	0.0	0.0	
733	0.0	0.0	0.0	0.0	0.0	
747	0.0	0.0	0.0	0.0	0.0	
748	0.0	0.0	0.0	0.0	0.0	
767	0.0	0.0	0.0	0.0	0.0	
769	0.0	0.0	0.0	0.0	0.0	
770	0.0	0.0	0.0	0.0	0.0	
772	0.0	0.0	0.0	0.0	0.0	
773	0.0	0.0	0.0	0.0	0.0	

774	0.0	0.0	0.0	0.0	0.0
775	0.0	0.0	0.0	0.0	0.0
776	0.0	0.0	0.0	0.0	0.0
777	0.0	0.0	0.0	0.0	0.0
809	0.0	0.0	0.0	0.0	0.0
810	0.0	0.0	0.0	0.0	0.0
819	0.0	0.0	0.0	0.0	0.0
833	0.0	0.0	0.0	0.0	0.0
908	0.0	0.0	0.0	0.0	0.0
914	0.0	0.0	0.0	0.0	0.0
934	0.0	0.0	0.0	0.0	0.0
962	0.0	0.0	0.0	0.0	0.0
986	0.0	0.0	0.0	0.0	0.0
988	0.0	0.0	0.0	0.0	0.0
1013	0.0	0.0	0.0	0.0	0.0
1019	0.0	0.0	0.0	0.0	0.0
1035	0.0	0.0	0.0	0.0	0.0
1053	0.0	0.0	0.0	0.0	0.0
1089	0.0	0.0	0.0	0.0	0.0
1107	0.0	0.0	0.0	0.0	0.0
1133	0.0	0.0	0.0	0.0	0.0
1147	0.0	0.0	0.0	0.0	0.0
1195	0.0	0.0	0.0	0.0	0.0
1222	0.0	0.0	0.0	0.0	0.0
1265	0.0	0.0	0.0	0.0	0.0
1305	0.0	0.0	0.0	0.0	0.0
1370	0.0	0.0	0.0	0.0	0.0
1385	0.0	0.0	0.0	0.0	0.0
1413	0.0	0.0	0.0	0.0	0.0
1429	0.0	0.0	0.0	0.0	0.0
1499	0.0	0.0	0.0	0.0	0.0
1549	0.0	0.0	0.0	0.0	0.0
1589	0.0	0.0	0.0	0.0	0.0
1596	0.0	0.0	0.0	0.0	0.0
1611	0.0	0.0	0.0	0.0	0.0
1695	0.0	0.0	0.0	0.0	0.0
1739	0.0	0.0	0.0	0.0	0.0
1745	0.0	0.0	0.0	0.0	0.0
1759	0.0	0.0	0.0	0.0	0.0
1770	0.0	0.0	0.0	0.0	0.0
1773	0.0	0.0	0.0	0.0	0.0
1804	0.0	0.0	0.0	0.0	0.0
1805	0.0	0.0	0.0	0.0	0.0
1822	0.0	0.0	0.0	0.0	0.0
1844	0.0	0.0	0.0	0.0	0.0
1862	0.0	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0	0.0

2038	0.0	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0	0.0
2136	0.0	0.0	0.0	0.0	0.0
2181	0.0	0.0	0.0	0.0	0.0
2227	0.0	0.0	0.0	0.0	0.0
2228	0.0	0.0	0.0	0.0	0.0
2230	0.0	0.0	0.0	0.0	0.0
2231	0.0	0.0	0.0	0.0	0.0
2232	0.0	0.0	0.0	0.0	0.0
2233	0.0	0.0	0.0	0.0	0.0
2235	0.0	0.0	0.0	0.0	0.0
2236	0.0	0.0	0.0	0.0	0.0
2298	0.0	0.0	0.0	0.0	0.0
2327	0.0	0.0	0.0	0.0	0.0
2365	0.0	0.0	0.0	0.0	0.0
2369	0.0	0.0	0.0	0.0	0.0
2392	0.0	0.0	0.0	0.0	0.0
2395	0.0	0.0	0.0	0.0	0.0
2480	0.0	0.0	0.0	0.0	0.0
2487	0.0	0.0	0.0	0.0	0.0
2505	0.0	0.0	0.0	0.0	0.0
2506	0.0	0.0	0.0	0.0	0.0
2518	0.0	0.0	0.0	0.0	0.0
2525	0.0	0.0	0.0	0.0	0.0
2566	0.0	0.0	0.0	0.0	0.0

	$500 to $549	$550 to $599	$600 to $649	$650 to $699	$700 to $749	\
18	0.0	0.0	0.0	0.0	0.0	
41	0.0	0.0	0.0	0.0	0.0	
86	0.0	0.0	0.0	0.0	0.0	
119	0.0	0.0	0.0	0.0	0.0	
129	0.0	0.0	0.0	0.0	0.0	
139	0.0	0.0	0.0	0.0	0.0	
214	0.0	0.0	0.0	0.0	0.0	
219	0.0	0.0	0.0	0.0	0.0	
228	0.0	0.0	0.0	0.0	0.0	
240	0.0	0.0	0.0	0.0	0.0	
245	0.0	0.0	0.0	0.0	0.0	
313	0.0	0.0	0.0	0.0	0.0	
403	0.0	0.0	0.0	0.0	0.0	
406	0.0	0.0	0.0	0.0	0.0	
455	0.0	0.0	0.0	0.0	0.0	
456	0.0	0.0	0.0	0.0	0.0	
465	0.0	0.0	0.0	0.0	0.0	
471	0.0	0.0	0.0	0.0	0.0	
485	0.0	0.0	0.0	0.0	0.0	
570	0.0	0.0	0.0	0.0	0.0	

592	0.0	0.0	0.0	0.0	0.0
644	0.0	0.0	0.0	0.0	0.0
645	0.0	0.0	0.0	0.0	0.0
731	0.0	0.0	0.0	0.0	0.0
733	0.0	0.0	0.0	0.0	0.0
747	0.0	0.0	0.0	0.0	0.0
748	0.0	0.0	0.0	0.0	0.0
767	0.0	0.0	0.0	0.0	0.0
769	0.0	0.0	0.0	0.0	0.0
770	0.0	0.0	0.0	0.0	0.0
772	0.0	0.0	0.0	0.0	0.0
773	0.0	0.0	0.0	0.0	0.0
774	0.0	0.0	0.0	0.0	0.0
775	0.0	0.0	0.0	0.0	0.0
776	0.0	0.0	0.0	0.0	0.0
777	0.0	0.0	0.0	0.0	0.0
809	0.0	0.0	0.0	0.0	0.0
810	0.0	0.0	0.0	0.0	0.0
819	0.0	0.0	0.0	0.0	0.0
833	0.0	0.0	0.0	0.0	0.0
908	0.0	0.0	0.0	0.0	0.0
914	0.0	0.0	0.0	0.0	0.0
934	0.0	0.0	0.0	0.0	0.0
962	0.0	0.0	0.0	0.0	0.0
986	0.0	0.0	0.0	0.0	0.0
988	0.0	0.0	0.0	0.0	0.0
1013	0.0	0.0	0.0	0.0	0.0
1019	0.0	0.0	0.0	0.0	0.0
1035	0.0	0.0	0.0	0.0	0.0
1053	0.0	0.0	0.0	0.0	0.0
1089	0.0	0.0	0.0	0.0	0.0
1107	0.0	0.0	0.0	0.0	0.0
1133	0.0	0.0	0.0	0.0	0.0
1147	0.0	0.0	0.0	0.0	0.0
1195	0.0	0.0	0.0	0.0	0.0
1222	0.0	0.0	0.0	0.0	0.0
1265	0.0	0.0	0.0	0.0	0.0
1305	0.0	0.0	0.0	0.0	0.0
1370	0.0	0.0	0.0	0.0	0.0
1385	0.0	0.0	0.0	0.0	0.0
1413	0.0	0.0	0.0	0.0	0.0
1429	0.0	0.0	0.0	0.0	0.0
1499	0.0	0.0	0.0	0.0	0.0
1549	0.0	0.0	0.0	0.0	0.0
1589	0.0	0.0	0.0	0.0	0.0
1596	0.0	0.0	0.0	0.0	0.0
1611	0.0	0.0	0.0	0.0	0.0

1695	0.0	0.0	0.0	0.0	0.0
1739	0.0	0.0	0.0	0.0	0.0
1745	0.0	0.0	0.0	0.0	0.0
1759	0.0	0.0	0.0	0.0	0.0
1770	0.0	0.0	0.0	0.0	0.0
1773	0.0	0.0	0.0	0.0	0.0
1804	0.0	0.0	0.0	0.0	0.0
1805	0.0	0.0	0.0	0.0	0.0
1822	0.0	0.0	0.0	0.0	0.0
1844	0.0	0.0	0.0	0.0	0.0
1862	0.0	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0	0.0
2136	0.0	0.0	0.0	0.0	0.0
2181	0.0	0.0	0.0	0.0	0.0
2227	0.0	0.0	0.0	0.0	0.0
2228	0.0	0.0	0.0	0.0	0.0
2230	0.0	0.0	0.0	0.0	0.0
2231	0.0	0.0	0.0	0.0	0.0
2232	0.0	0.0	0.0	0.0	0.0
2233	0.0	0.0	0.0	0.0	0.0
2235	0.0	0.0	0.0	0.0	0.0
2236	0.0	0.0	0.0	0.0	0.0
2298	0.0	0.0	0.0	0.0	0.0
2327	0.0	0.0	0.0	0.0	0.0
2365	0.0	0.0	0.0	0.0	0.0
2369	0.0	0.0	0.0	0.0	0.0
2392	0.0	0.0	0.0	0.0	0.0
2395	0.0	0.0	0.0	0.0	0.0
2480	0.0	0.0	0.0	0.0	0.0
2487	0.0	0.0	0.0	0.0	0.0
2505	0.0	0.0	0.0	0.0	0.0
2506	0.0	0.0	0.0	0.0	0.0
2518	0.0	0.0	0.0	0.0	0.0
2525	0.0	0.0	0.0	0.0	0.0
2566	0.0	0.0	0.0	0.0	0.0

	$750 to $799	$800 to $899	$900 to $999	$1,000 to $1,249	\
18	0.0	0.0	0.0	0.0	
41	0.0	0.0	0.0	0.0	
86	0.0	0.0	0.0	0.0	
119	0.0	0.0	0.0	0.0	
129	0.0	0.0	0.0	0.0	
139	0.0	0.0	0.0	0.0	
214	0.0	0.0	0.0	0.0	
219	0.0	0.0	0.0	0.0	

228	0.0	0.0	0.0	0.0
240	0.0	0.0	0.0	0.0
245	0.0	0.0	0.0	0.0
313	0.0	0.0	0.0	0.0
403	0.0	0.0	0.0	0.0
406	0.0	0.0	0.0	0.0
455	0.0	0.0	0.0	0.0
456	0.0	0.0	0.0	0.0
465	0.0	0.0	0.0	0.0
471	0.0	0.0	0.0	0.0
485	0.0	0.0	0.0	0.0
570	0.0	0.0	0.0	0.0
592	0.0	0.0	0.0	0.0
644	0.0	0.0	0.0	0.0
645	0.0	0.0	0.0	0.0
731	0.0	0.0	0.0	0.0
733	0.0	0.0	0.0	0.0
747	0.0	0.0	0.0	0.0
748	0.0	0.0	0.0	0.0
767	0.0	0.0	0.0	0.0
769	0.0	0.0	0.0	0.0
770	0.0	0.0	0.0	0.0
772	0.0	0.0	0.0	0.0
773	0.0	0.0	0.0	0.0
774	0.0	0.0	0.0	0.0
775	0.0	0.0	0.0	0.0
776	0.0	0.0	0.0	0.0
777	0.0	0.0	0.0	0.0
809	0.0	0.0	0.0	0.0
810	0.0	0.0	0.0	0.0
819	0.0	0.0	0.0	0.0
833	0.0	0.0	0.0	0.0
908	0.0	0.0	0.0	0.0
914	0.0	0.0	0.0	0.0
934	0.0	0.0	0.0	0.0
962	0.0	0.0	0.0	0.0
986	0.0	0.0	0.0	0.0
988	0.0	0.0	0.0	0.0
1013	0.0	0.0	0.0	0.0
1019	0.0	0.0	0.0	0.0
1035	0.0	0.0	0.0	0.0
1053	0.0	0.0	0.0	0.0
1089	0.0	0.0	0.0	0.0
1107	0.0	0.0	0.0	0.0
1133	0.0	0.0	0.0	0.0
1147	0.0	0.0	0.0	0.0
1195	0.0	0.0	0.0	0.0

1222	0.0	0.0	0.0	0.0
1265	0.0	0.0	0.0	0.0
1305	0.0	0.0	0.0	0.0
1370	0.0	0.0	0.0	0.0
1385	0.0	0.0	0.0	0.0
1413	0.0	0.0	0.0	0.0
1429	0.0	0.0	0.0	0.0
1499	0.0	0.0	0.0	0.0
1549	0.0	0.0	0.0	0.0
1589	0.0	0.0	0.0	0.0
1596	0.0	0.0	0.0	0.0
1611	0.0	0.0	0.0	0.0
1695	0.0	0.0	0.0	0.0
1739	0.0	0.0	0.0	0.0
1745	0.0	0.0	0.0	0.0
1759	0.0	0.0	0.0	0.0
1770	0.0	0.0	0.0	0.0
1773	0.0	0.0	0.0	0.0
1804	0.0	0.0	0.0	0.0
1805	0.0	0.0	0.0	0.0
1822	0.0	0.0	0.0	0.0
1844	0.0	0.0	0.0	0.0
1862	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2136	0.0	0.0	0.0	0.0
2181	0.0	0.0	0.0	0.0
2227	0.0	0.0	0.0	0.0
2228	0.0	0.0	0.0	0.0
2230	0.0	0.0	0.0	0.0
2231	0.0	0.0	0.0	0.0
2232	0.0	0.0	0.0	0.0
2233	0.0	0.0	0.0	0.0
2235	0.0	0.0	0.0	0.0
2236	0.0	0.0	0.0	0.0
2298	0.0	0.0	0.0	0.0
2327	0.0	0.0	0.0	0.0
2365	0.0	0.0	0.0	0.0
2369	0.0	0.0	0.0	0.0
2392	0.0	0.0	0.0	0.0
2395	0.0	0.0	0.0	0.0
2480	0.0	0.0	0.0	0.0
2487	0.0	0.0	0.0	0.0
2505	0.0	0.0	0.0	0.0
2506	0.0	0.0	0.0	0.0
2518	0.0	0.0	0.0	0.0

2525	0.0	0.0	0.0	0.0
2566	0.0	0.0	0.0	0.0

	$1,250 to $1,499	$1,500 to $1,999	$2,000 to $2,499	$2,500 to $2,999	\
18	0.0	0.0	0.0	0.0	
41	0.0	0.0	0.0	0.0	
86	0.0	0.0	0.0	0.0	
119	0.0	0.0	0.0	0.0	
129	0.0	0.0	0.0	0.0	
139	0.0	0.0	0.0	0.0	
214	0.0	0.0	0.0	0.0	
219	0.0	0.0	0.0	0.0	
228	0.0	0.0	0.0	0.0	
240	0.0	0.0	0.0	0.0	
245	0.0	0.0	0.0	0.0	
313	0.0	0.0	0.0	0.0	
403	0.0	0.0	0.0	0.0	
406	0.0	0.0	0.0	0.0	
455	0.0	0.0	0.0	0.0	
456	0.0	0.0	0.0	0.0	
465	0.0	0.0	0.0	0.0	
471	0.0	0.0	0.0	0.0	
485	0.0	0.0	0.0	0.0	
570	0.0	0.0	0.0	0.0	
592	0.0	0.0	0.0	0.0	
644	0.0	0.0	0.0	0.0	
645	0.0	0.0	0.0	0.0	
731	0.0	0.0	0.0	0.0	
733	0.0	0.0	0.0	0.0	
747	0.0	0.0	0.0	0.0	
748	0.0	0.0	0.0	0.0	
767	0.0	0.0	0.0	0.0	
769	0.0	0.0	0.0	0.0	
770	0.0	0.0	0.0	0.0	
772	0.0	0.0	0.0	0.0	
773	0.0	0.0	0.0	0.0	
774	0.0	0.0	0.0	0.0	
775	0.0	0.0	0.0	0.0	
776	0.0	0.0	0.0	0.0	
777	0.0	0.0	0.0	0.0	
809	0.0	0.0	0.0	0.0	
810	0.0	0.0	0.0	0.0	
819	0.0	0.0	0.0	0.0	
833	0.0	0.0	0.0	0.0	
908	0.0	0.0	0.0	0.0	
914	0.0	0.0	0.0	0.0	
934	0.0	0.0	0.0	0.0	

962	0.0	0.0	0.0	0.0
986	0.0	0.0	0.0	0.0
988	0.0	0.0	0.0	0.0
1013	0.0	0.0	0.0	0.0
1019	0.0	0.0	0.0	0.0
1035	0.0	0.0	0.0	0.0
1053	0.0	0.0	0.0	0.0
1089	0.0	0.0	0.0	0.0
1107	0.0	0.0	0.0	0.0
1133	0.0	0.0	0.0	0.0
1147	0.0	0.0	0.0	0.0
1195	0.0	0.0	0.0	0.0
1222	0.0	0.0	0.0	0.0
1265	0.0	0.0	0.0	0.0
1305	0.0	0.0	0.0	0.0
1370	0.0	0.0	0.0	0.0
1385	0.0	0.0	0.0	0.0
1413	0.0	0.0	0.0	0.0
1429	0.0	0.0	0.0	0.0
1499	0.0	0.0	0.0	0.0
1549	0.0	0.0	0.0	0.0
1589	0.0	0.0	0.0	0.0
1596	0.0	0.0	0.0	0.0
1611	0.0	0.0	0.0	0.0
1695	0.0	0.0	0.0	0.0
1739	0.0	0.0	0.0	0.0
1745	0.0	0.0	0.0	0.0
1759	0.0	0.0	0.0	0.0
1770	0.0	0.0	0.0	0.0
1773	0.0	0.0	0.0	0.0
1804	0.0	0.0	0.0	0.0
1805	0.0	0.0	0.0	0.0
1822	0.0	0.0	0.0	0.0
1844	0.0	0.0	0.0	0.0
1862	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2136	0.0	0.0	0.0	0.0
2181	0.0	0.0	0.0	0.0
2227	0.0	0.0	0.0	0.0
2228	0.0	0.0	0.0	0.0
2230	0.0	0.0	0.0	0.0
2231	0.0	0.0	0.0	0.0
2232	0.0	0.0	0.0	0.0
2233	0.0	0.0	0.0	0.0
2235	0.0	0.0	0.0	0.0

2236	0.0	0.0	0.0	0.0
2298	0.0	0.0	0.0	0.0
2327	0.0	0.0	0.0	0.0
2365	0.0	0.0	0.0	0.0
2369	0.0	0.0	0.0	0.0
2392	0.0	0.0	0.0	0.0
2395	0.0	0.0	0.0	0.0
2480	0.0	0.0	0.0	0.0
2487	0.0	0.0	0.0	0.0
2505	0.0	0.0	0.0	0.0
2506	0.0	0.0	0.0	0.0
2518	0.0	0.0	0.0	0.0
2525	0.0	0.0	0.0	0.0
2566	0.0	0.0	0.0	0.0

	$3,000 to $3,499	$3,500 or more	No cash rent	\
18	0.0	0.0	0.0	
41	0.0	0.0	0.0	
86	0.0	0.0	0.0	
119	0.0	0.0	0.0	
129	0.0	0.0	0.0	
139	0.0	0.0	0.0	
214	0.0	0.0	0.0	
219	0.0	0.0	0.0	
228	0.0	0.0	0.0	
240	0.0	0.0	0.0	
245	0.0	0.0	0.0	
313	0.0	0.0	0.0	
403	0.0	0.0	0.0	
406	0.0	0.0	0.0	
455	0.0	0.0	0.0	
456	0.0	0.0	0.0	
465	0.0	0.0	0.0	
471	0.0	0.0	0.0	
485	0.0	0.0	0.0	
570	0.0	0.0	0.0	
592	0.0	0.0	0.0	
644	0.0	0.0	0.0	
645	0.0	0.0	0.0	
731	0.0	0.0	0.0	
733	0.0	0.0	0.0	
747	0.0	0.0	0.0	
748	0.0	0.0	0.0	
767	0.0	0.0	0.0	
769	0.0	0.0	0.0	
770	0.0	0.0	0.0	
772	0.0	0.0	0.0	

773	0.0	0.0	0.0
774	0.0	0.0	0.0
775	0.0	0.0	0.0
776	0.0	0.0	0.0
777	0.0	0.0	0.0
809	0.0	0.0	0.0
810	0.0	0.0	0.0
819	0.0	0.0	0.0
833	0.0	0.0	0.0
908	0.0	0.0	0.0
914	0.0	0.0	0.0
934	0.0	0.0	0.0
962	0.0	0.0	0.0
986	0.0	0.0	0.0
988	0.0	0.0	0.0
1013	0.0	0.0	0.0
1019	0.0	0.0	0.0
1035	0.0	0.0	0.0
1053	0.0	0.0	0.0
1089	0.0	0.0	0.0
1107	0.0	0.0	0.0
1133	0.0	0.0	0.0
1147	0.0	0.0	0.0
1195	0.0	0.0	0.0
1222	0.0	0.0	0.0
1265	0.0	0.0	0.0
1305	0.0	0.0	0.0
1370	0.0	0.0	0.0
1385	0.0	0.0	0.0
1413	0.0	0.0	0.0
1429	0.0	0.0	0.0
1499	0.0	0.0	0.0
1549	0.0	0.0	0.0
1589	0.0	0.0	0.0
1596	0.0	0.0	0.0
1611	0.0	0.0	0.0
1695	0.0	0.0	0.0
1739	0.0	0.0	0.0
1745	0.0	0.0	0.0
1759	0.0	0.0	0.0
1770	0.0	0.0	0.0
1773	0.0	0.0	0.0
1804	0.0	0.0	0.0
1805	0.0	0.0	0.0
1822	0.0	0.0	0.0
1844	0.0	0.0	0.0
1862	0.0	0.0	0.0

1968	0.0	0.0	0.0
2038	0.0	0.0	0.0
2039	0.0	0.0	0.0
2136	0.0	0.0	0.0
2181	0.0	0.0	0.0
2227	0.0	0.0	0.0
2228	0.0	0.0	0.0
2230	0.0	0.0	0.0
2231	0.0	0.0	0.0
2232	0.0	0.0	0.0
2233	0.0	0.0	0.0
2235	0.0	0.0	0.0
2236	0.0	0.0	0.0
2298	0.0	0.0	0.0
2327	0.0	0.0	0.0
2365	0.0	0.0	0.0
2369	0.0	0.0	0.0
2392	0.0	0.0	0.0
2395	0.0	0.0	0.0
2480	0.0	0.0	0.0
2487	0.0	0.0	0.0
2505	0.0	0.0	0.0
2506	0.0	0.0	0.0
2518	0.0	0.0	0.0
2525	0.0	0.0	0.0
2566	0.0	0.0	0.0

	geometry
18	MULTIPOLYGON (((-67.18630 18.37942, -67.18615 …
41	MULTIPOLYGON (((-67.24915 18.41921, -67.24869 …
86	MULTIPOLYGON (((-67.22272 18.48982, -67.22236 …
119	MULTIPOLYGON (((-67.11576 18.27082, -67.11567 …
129	MULTIPOLYGON (((-67.14682 18.29237, -67.14663 …
139	MULTIPOLYGON (((-67.23991 18.27448, -67.22753 …
214	MULTIPOLYGON (((-66.76469 18.53833, -66.76346 …
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245	MULTIPOLYGON (((-66.58516 18.49425, -66.58489 …
313	MULTIPOLYGON (((-66.16541 18.42984, -66.16541 …
403	MULTIPOLYGON (((-66.16639 18.33391, -66.16567 …
406	MULTIPOLYGON (((-66.14183 18.34941, -66.14173 …
455	MULTIPOLYGON (((-67.21813 17.96763, -67.21754 …
456	MULTIPOLYGON (((-67.26749 17.98307, -67.26656 …
465	MULTIPOLYGON (((-66.05919 18.28694, -66.05910 …
471	MULTIPOLYGON (((-66.05720 18.27060, -66.05702 …
485	MULTIPOLYGON (((-66.02967 18.24996, -66.02953 …

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592   MULTIPOLYGON (((-66.90211 18.53842, -66.90104 …
644   MULTIPOLYGON (((-65.97315 18.40652, -65.97315 …
645   MULTIPOLYGON (((-65.97350 18.40971, -65.97350 …
731   MULTIPOLYGON (((-65.94985 18.37010, -65.94964 …
733   MULTIPOLYGON (((-65.95272 18.31623, -65.95246 …
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767   MULTIPOLYGON (((-66.16590 18.43275, -66.16589 …
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775   MULTIPOLYGON (((-66.13698 18.43032, -66.13696 …
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777   MULTIPOLYGON (((-66.13821 18.46280, -66.13510 …
809   MULTIPOLYGON (((-65.67044 18.22463, -65.67033 …
810   MULTIPOLYGON (((-65.66226 18.20695, -65.66221 …
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908   MULTIPOLYGON (((-66.33357 18.25456, -66.33332 …
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986   MULTIPOLYGON (((-66.99962 17.91585, -66.98969 …
988   MULTIPOLYGON (((-66.12959 18.04312, -66.12938 …
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1133  MULTIPOLYGON (((-66.81471 18.47001, -66.81454 …
1147  MULTIPOLYGON (((-66.83669 18.54021, -66.83135 …
1195  MULTIPOLYGON (((-65.79357 18.07149, -65.79315 …
1222  MULTIPOLYGON (((-67.10484 18.56659, -67.10181 …
1265  MULTIPOLYGON (((-66.54536 17.95445, -66.54481 …
1305  MULTIPOLYGON (((-67.10989 17.94235, -67.10758 …
1370  MULTIPOLYGON (((-65.99340 18.51660, -65.98767 …
1385  MULTIPOLYGON (((-65.74858 18.38707, -65.74185 …
1413  MULTIPOLYGON (((-66.53327 18.48577, -66.53314 …
1429  MULTIPOLYGON (((-65.90693 17.97751, -65.90326 …
1499  MULTIPOLYGON (((-67.25420 18.25264, -67.24962 …
1549  MULTIPOLYGON (((-65.73650 18.17075, -65.73409 …
1589  MULTIPOLYGON (((-66.03826 18.00077, -66.03792 …
1596  MULTIPOLYGON (((-66.01321 17.96702, -66.01106 …
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1611  MULTIPOLYGON (((-66.77549 17.99164, -66.77414 …
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1759  MULTIPOLYGON (((-66.95669 18.49244, -66.95620 …
1770  MULTIPOLYGON (((-67.32325 18.36388, -67.32227 …
1773  MULTIPOLYGON (((-65.79761 18.38100, -65.79742 …
1804  MULTIPOLYGON (((-65.82677 18.42784, -65.82628 …
1805  MULTIPOLYGON (((-66.95435 18.07508, -66.95418 …
1822  MULTIPOLYGON (((-66.24451 18.07615, -66.24444 …
1844  MULTIPOLYGON (((-66.33680 17.96692, -66.32640 …
1862  MULTIPOLYGON (((-67.10890 18.05664, -67.10892 …
1968  MULTIPOLYGON (((-66.05595 18.42848, -66.05575 …
2038  MULTIPOLYGON (((-66.04397 18.40937, -66.04393 …
2039  MULTIPOLYGON (((-66.05250 18.40750, -66.05174 …
2136  MULTIPOLYGON (((-66.07196 18.38648, -66.07196 …
2181  MULTIPOLYGON (((-66.08581 18.38608, -66.08576 …
2227  MULTIPOLYGON (((-66.07828 18.41638, -66.07704 …
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2230  MULTIPOLYGON (((-66.10834 18.44248, -66.10742 …
2231  MULTIPOLYGON (((-66.09462 18.47024, -66.09203 …
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2235  MULTIPOLYGON (((-66.08527 18.44116, -66.08280 …
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2298  MULTIPOLYGON (((-66.45137 17.96632, -66.43701 …
2327  MULTIPOLYGON (((-66.24766 18.37678, -66.24744 …
2365  MULTIPOLYGON (((-66.20749 18.43843, -66.20614 …
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2392  MULTIPOLYGON (((-66.19565 18.47106, -66.19327 …
2395  MULTIPOLYGON (((-66.02526 18.37983, -66.02519 …
2480  MULTIPOLYGON (((-66.35009 18.54101, -66.34739 …
2487  MULTIPOLYGON (((-66.41847 18.47759, -66.41818 …
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2506  MULTIPOLYGON (((-66.40035 18.43625, -66.40021 …
2518  MULTIPOLYGON (((-66.43862 18.49332, -66.43850 …
2525  MULTIPOLYGON (((-65.63097 18.12302, -65.63095 …
2566  MULTIPOLYGON (((-65.84775 18.00767, -65.84587 …
```

[50]:
```
# create a new variable for census tracts with zero pop
gdf_no_rent = gdf[gdf['Total']==0]
```

[51]:
```
# how many records?
print('There are ' + str(len(gdf_no_rent)) + ' blockgroups with no rent-paying␣
 ↪in them')
```

```
There are 104 blockgroups with no rent-paying in them
```

[52]:
```
# display it
gdf_no_rent[['geoid','Total']]
```

[52]:

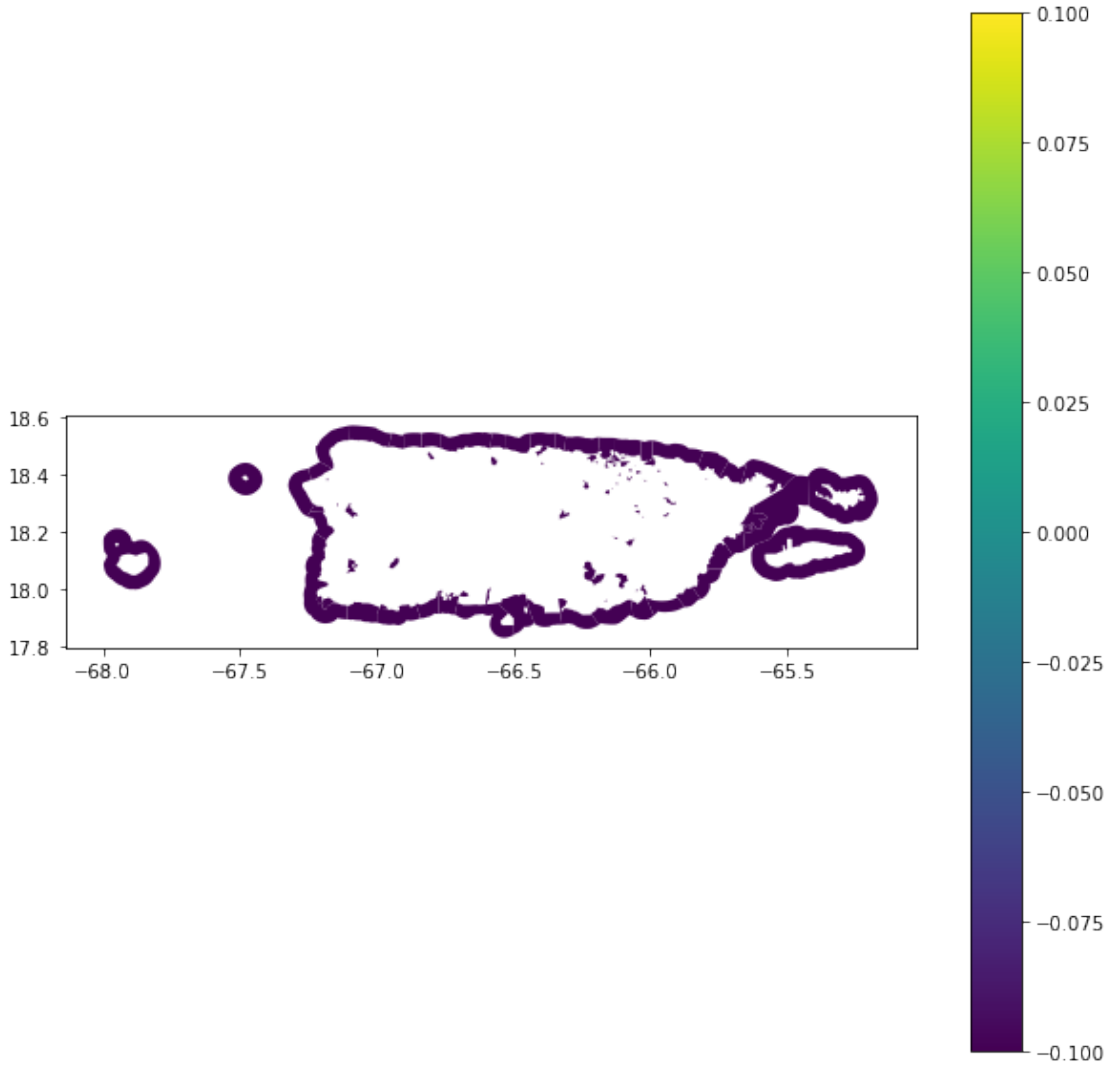
	geoid	Total
18	15000US720034302003	0.0
41	15000US720039900000	0.0
86	15000US720059900000	0.0
119	15000US720118101002	0.0
129	15000US720118105001	0.0
139	15000US720119900000	0.0
214	15000US720139929000	0.0
219	15000US720152801023	0.0
228	15000US720159915000	0.0
240	15000US720175903004	0.0
245	15000US720179900000	0.0
313	15000US720210310314	0.0
403	15000US720210317043	0.0
406	15000US720210318002	0.0
455	15000US720239800001	0.0
456	15000US720239900000	0.0
465	15000US720252002004	0.0
471	15000US720252003026	0.0
485	15000US720252005001	0.0
570	15000US720252028003	0.0
592	15000US720279900000	0.0
644	15000US720310502122	0.0
645	15000US720310502123	0.0
731	15000US720310509024	0.0
733	15000US720310510011	0.0
747	15000US720319800031	0.0
748	15000US720319900000	0.0
767	15000US720330205002	0.0
769	15000US720339800011	0.0
770	15000US720339800021	0.0
772	15000US720339800041	0.0
773	15000US720339800051	0.0
774	15000US720339800061	0.0
775	15000US720339800071	0.0
776	15000US720339800081	0.0
777	15000US720339902010	0.0
809	15000US720371601001	0.0
810	15000US720371601002	0.0
819	15000US720379900000	0.0
833	15000US720412401012	0.0
908	15000US720475306001	0.0
914	15000US720499905010	0.0
934	15000US720519900210	0.0

962	15000US720539901030	0.0
986	15000US720559900000	0.0
988	15000US720572701002	0.0
1013	15000US720572707002	0.0
1019	15000US720579926000	0.0
1035	15000US720599900010	0.0
1053	15000US720610403042	0.0
1089	15000US720610406026	0.0
1107	15000US720632102022	0.0
1133	15000US720653103003	0.0
1147	15000US720659900160	0.0
1195	15000US720699918000	0.0
1222	15000US720719900000	0.0
1265	15000US720759900010	0.0
1305	15000US720799911000	0.0
1370	15000US720879900000	0.0
1385	15000US720899900010	0.0
1413	15000US720919900250	0.0
1429	15000US720959900000	0.0
1499	15000US720979900000	0.0
1549	15000US721039900130	0.0
1589	15000US721092902004	0.0
1596	15000US721099900000	0.0
1611	15000US721119900000	0.0
1695	15000US721130722026	0.0
1739	15000US721130730081	0.0
1745	15000US721139930000	0.0
1759	15000US721159900000	0.0
1770	15000US721179904000	0.0
1773	15000US721191301013	0.0
1804	15000US721199927000	0.0
1805	15000US721219603001	0.0
1822	15000US721239526001	0.0
1844	15000US721239928000	0.0
1862	15000US721258406002	0.0
1968	15000US721270044002	0.0
2038	15000US721270058002	0.0
2039	15000US721270058003	0.0
2136	15000US721270086025	0.0
2181	15000US721270098002	0.0
2227	15000US721279801011	0.0
2228	15000US721279801021	0.0
2230	15000US721279801041	0.0
2231	15000US721279801051	0.0
2232	15000US721279801071	0.0
2233	15000US721279801081	0.0
2235	15000US721279803001	0.0

```
2236  15000US721279900000    0.0
2298  15000US721339900000    0.0
2327  15000US721355106022    0.0
2365  15000US721371214003    0.0
2369  15000US721371217023    0.0
2392  15000US721379900000    0.0
2395  15000US721390601023    0.0
2480  15000US721439900000    0.0
2487  15000US721455602042    0.0
2505  15000US721455607013    0.0
2506  15000US721455607014    0.0
2518  15000US721459900000    0.0
2525  15000US721479900000    0.0
2566  15000US721519900000    0.0
```

[53]:
```
# Quiz! Plot the census tracts with zero rent-paying below (make it nice and␣
 ↪big)
gdf_no_pop.plot(figsize=(10,10),
                           column='Total',
                           legend=True)
```

[53]: <AxesSubplot:>



[54]:
```
# output columns
list(gdf)
```

[54]:
```
['geoid',
 'name',
 'Total',
 'With cash rent',
 'Less than $100',
 '$100 to $149',
 '$150 to $199',
 '200 to $249',
 '$250 to $299',
 '$300 to $349',
 '$350 to $399',
```

```
 '$400 to $449',
 '$450 to $499',
 '$500 to $549',
 '$550 to $599',
 '$600 to $649',
 '$650 to $699',
 '$700 to $749',
 '$750 to $799',
 '$800 to $899',
 '$900 to $999',
 '$1,000 to $1,249',
 '$1,250 to $1,499',
 '$1,500 to $1,999',
 '$2,000 to $2,499',
 '$2,500 to $2,999',
 '$3,000 to $3,499',
 '$3,500 or more',
 'No cash rent',
 'geometry']
```

[58]:
```
gdf.head()
```

[58]:

	geoid	name	Total	With cash rent	Less than $100	$100 to $149	$150 to $199	200 to $249	$250 to $299	$300 to $349	$350 to $399	$400 to $449	$450 to $499	$500 to $549	$550 to $599	$600 to $649	$650 to $699	$700 to $749	$750 to $799
1	15000US720019563001	Block Group 1, Adjuntas, PR	167.0	89.0	0.0	0.0	0.000000	0.0	0.0	47.0	10.0	0.0	17.0	0.0	15.0	0.0	0.0	0.0	0.0
2	15000US720019563002	Block Group 2, Adjuntas, PR	223.0	94.0	0.0	0.0	5.381166	0.0	0.0	21.0	15.0	18.0	16.0	0.0	0.0	12.0	0.0	0.0	0.0
3	15000US720019564001	Block Group 1, Adjuntas, PR	239.0	149.0	0.0	0.0	0.000000	0.0	0.0	14.0	27.0	19.0	33.0	13.0	16.0	27.0	0.0	0.0	0.0
4	15000US720019564002	Block Group 2, Adjuntas, PR	154.0	16.0	0.0	0.0	0.000000	0.0	0.0	0.0	16.0	0.0	0.0	0.0					
5	15000US720019565001	Block Group 1, Adjuntas, PR	198.0	88.0	0.0	0.0	0.000000	0.0	28.0	29.0	0.0	15.0	0.0	16.0					

```
4           0.0           0.0           0.0           0.0           0.0
5           0.0           0.0           0.0           0.0           0.0

   $800 to $899  $900 to $999  $1,000 to $1,249  $1,250 to $1,499  \
1           0.0           0.0               0.0               0.0
2           0.0           0.0               0.0               0.0
3           0.0           0.0               0.0               0.0
4           0.0           0.0               0.0               0.0
5           0.0           0.0               0.0               0.0

   $1,500 to $1,999  $2,000 to $2,499  $2,500 to $2,999  $3,000 to $3,499  \
1               0.0               0.0               0.0               0.0
2               0.0               0.0               0.0               0.0
3               0.0               0.0               0.0               0.0
4               0.0               0.0               0.0               0.0
5               0.0               0.0               0.0               0.0

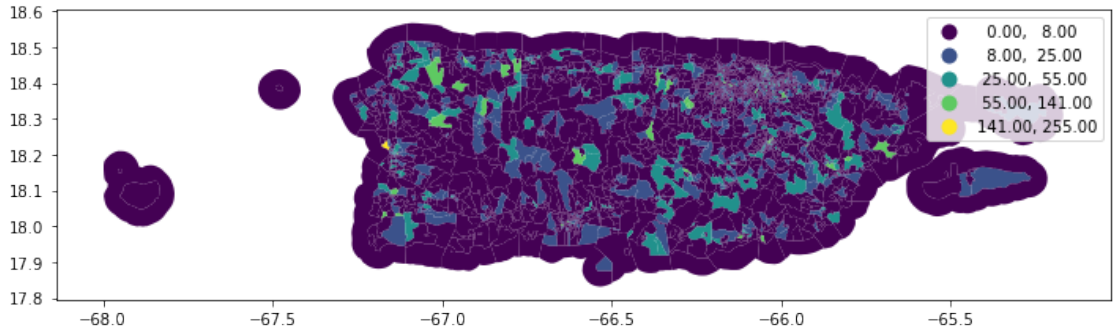
   $3,500 or more  No cash rent  \
1             0.0          78.0
2             0.0         129.0
3             0.0          90.0
4             0.0         138.0
5             0.0         110.0

                                              geometry
1  MULTIPOLYGON (((-66.75808 18.17672, -66.75776 …
2  MULTIPOLYGON (((-66.79443 18.24988, -66.79381 …
3  MULTIPOLYGON (((-66.83326 18.22802, -66.83275 …
4  MULTIPOLYGON (((-66.83723 18.19298, -66.83685 …
5  MULTIPOLYGON (((-66.77916 18.15809, -66.77876 …
```

Okay, I'm going to try to do a map now…

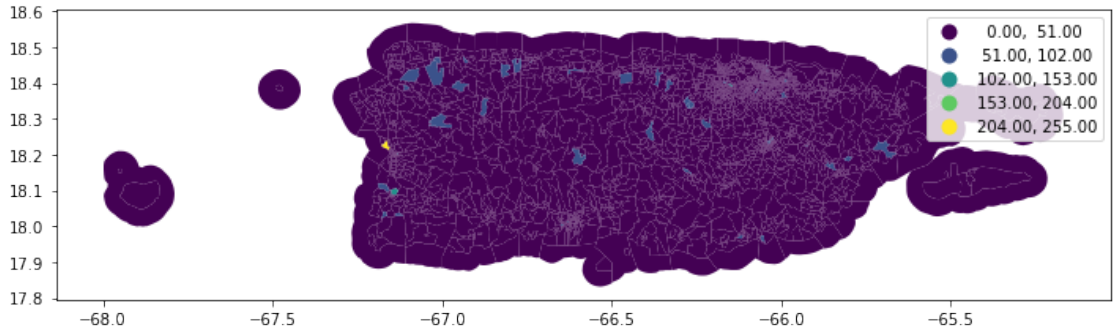
[60]:
```
# natural breaks
gdf.plot(figsize=(12,12),
                 column='$450 to $499',
                 legend=True,
                 scheme='NaturalBreaks')
```

[60]: <AxesSubplot:>



[61]:
```
# equal interval
gdf.plot(figsize=(12,12),
                  column='$450 to $499',
                  legend=True,
                  scheme='equal_interval')
```

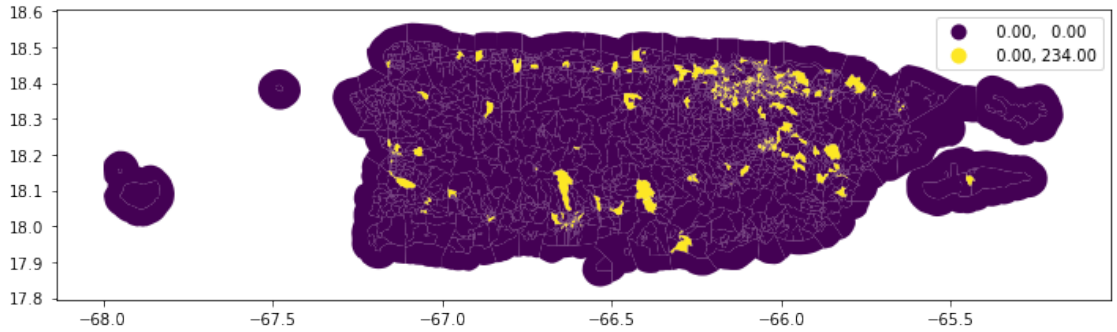
[61]: <AxesSubplot:>



[62]:
```
# quantiles
gdf.plot(figsize=(12,12),
                  column='$900 to $999',
                  legend=True,
                  scheme='quantiles')
```

```
/opt/conda/lib/python3.9/site-packages/mapclassify/classifiers.py:238:
UserWarning: Warning: Not enough unique values in array to form k classes
  Warn(
/opt/conda/lib/python3.9/site-packages/mapclassify/classifiers.py:241:
UserWarning: Warning: setting k to 2
  Warn("Warning: setting k to %d" % k_q, UserWarning)
```

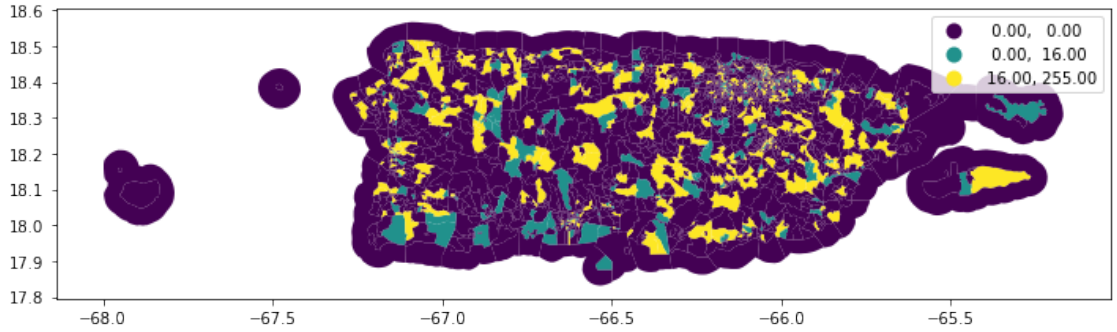
[62]: <AxesSubplot:>



[63]:
```
# quantiles
gdf.plot(figsize=(12,12),
                  column='$450 to $499',
                  legend=True,
                  scheme='quantiles')
```

```
/opt/conda/lib/python3.9/site-packages/mapclassify/classifiers.py:238:
UserWarning: Warning: Not enough unique values in array to form k classes
  Warn(
/opt/conda/lib/python3.9/site-packages/mapclassify/classifiers.py:241:
UserWarning: Warning: setting k to 3
  Warn("Warning: setting k to %d" % k_q, UserWarning)
```

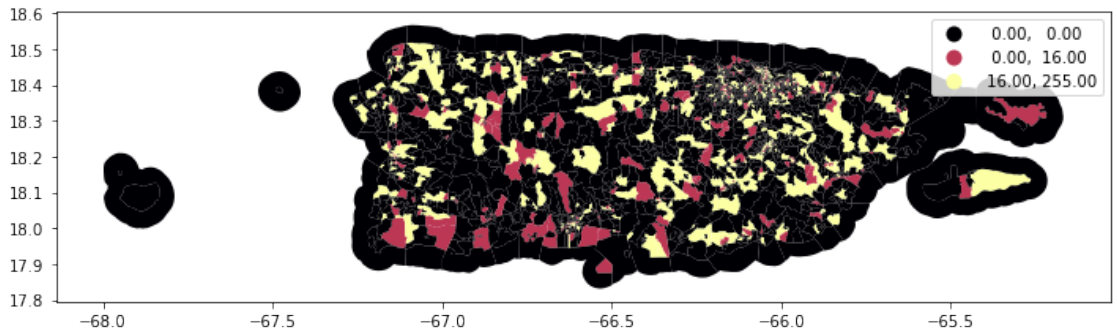
[63]: <AxesSubplot:>



[64]:
```
# quantiles with different color scheme
gdf.plot(figsize=(12,12),
                  column='$450 to $499',
                  legend=True,
                  scheme='quantiles',
                  cmap='inferno'
        )
```

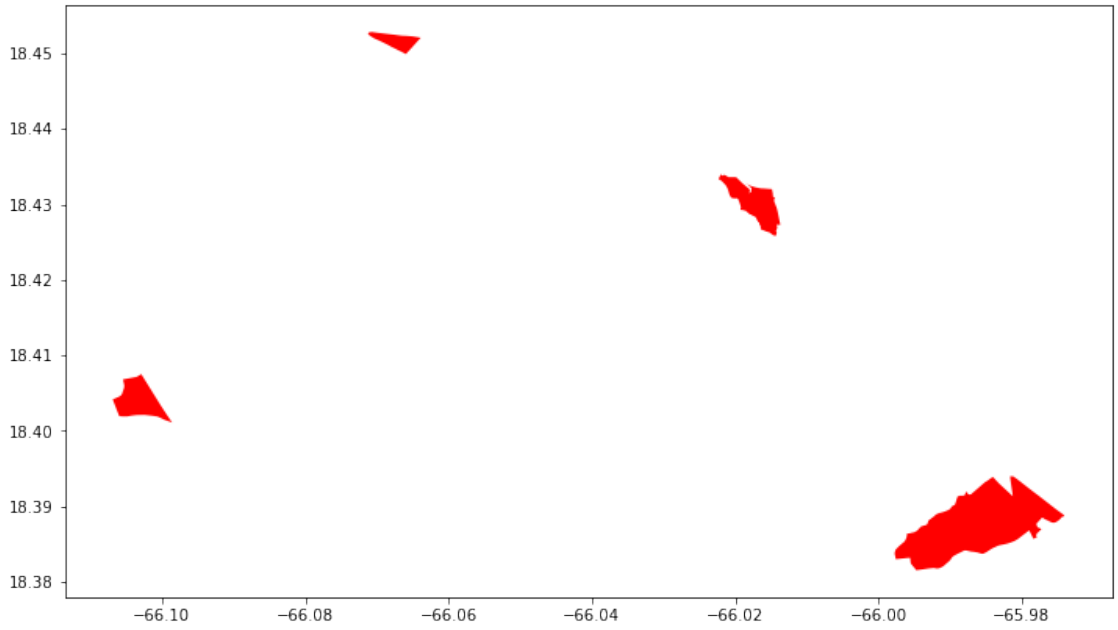
```
/opt/conda/lib/python3.9/site-packages/mapclassify/classifiers.py:238:
UserWarning: Warning: Not enough unique values in array to form k classes
  Warn(
/opt/conda/lib/python3.9/site-packages/mapclassify/classifiers.py:241:
UserWarning: Warning: setting k to 3
  Warn("Warning: setting k to %d" % k_q, UserWarning)
```

[64]: <AxesSubplot:>



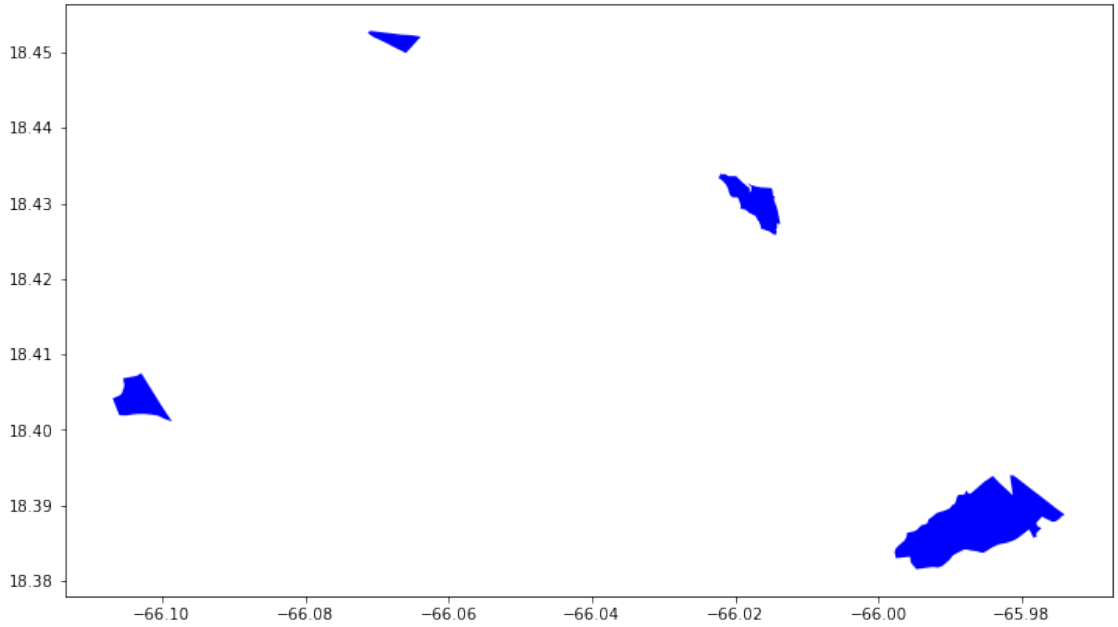
[65]:
```
# plot it in red
gdf[gdf['$900 to $999'] > 90].plot(figsize=(12,10),color="red")
```

[65]: <AxesSubplot:>



[69]:
```
# plot it in red
gdf[gdf['$900 to $999'] > 90].plot(figsize=(12,10),color="blue")
```

[69]: <AxesSubplot:>



[70]:
```
#Okay, I will add a basemap now
```

[71]:
```
# reproject to Web Mercator
gdf_web_mercator = gdf.to_crs(epsg=3857)
```

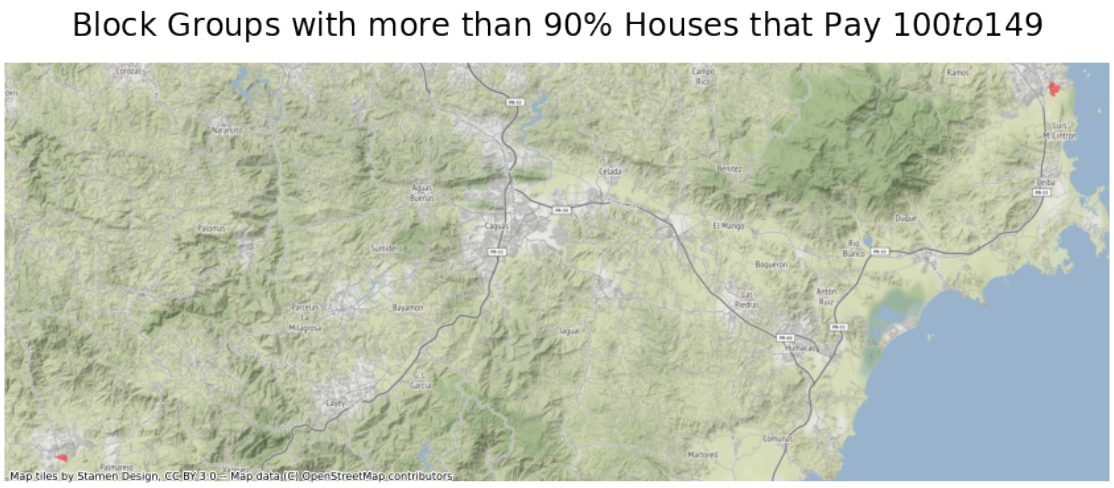
[75]:
```
# use subplots that make it easier to create multiple layered maps
fig, ax = plt.subplots(figsize=(15, 15))

# add the layer with ax=ax in the argument
gdf_web_mercator[gdf_web_mercator['$100 to $149'] > 90].plot(
                                                        ax=ax,
                                                        color="red",
                                                        alpha=0.5
)

# turn the axis off
ax.axis('off')

# set a title
ax.set_title('Block Groups with more than 90% Houses that Pay $100 to␣
 ↪$149',fontsize=24,pad=20)
```

```
# add a basemap
ctx.add_basemap(ax)
```



[76]:
```
# use subplots that make it easier to create multiple layered maps
fig, ax = plt.subplots(figsize=(15, 15))

# add the layer with ax=ax in the argument
gdf_web_mercator[gdf_web_mercator['$450 to $499'] > 90].plot(
                                                        ax=ax,
                                                        color="red",
                                                        alpha=0.5
)

# turn the axis off
ax.axis('off')

# set a title
ax.set_title('Block Groups with more than 90% Houses that Pay $450 to $499 in␣
 ↪Gross Rent',fontsize=24,pad=20)

# add a basemap
ctx.add_basemap(ax)
```

Block Groups with more than 90% Houses that Pay 450*to*499 in Gross Rent

It was sooo good finally doing some maps! I think my next step will be to run this with only San Juan, perhaps looking at different variables for rent.

[ ]: