So in this example, we're going to use buffers and chloropleth maps to visualize truck routes in California.

The first thing we're going to do is download Matplotlib, which extends mapping capacities in Python, and Geopandas, which allows us to handle geospatial data in some cool ways.

In [1]:
```
%matplotlib inline
import matplotlib
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
import geopandas as gpd
```

First, we'll download the data for truck routes, Southern California tracts, and Riverside in California.

In [3]:
```
routes_df = gpd.read_file('data/Truck_Route_Network.shp')
```

In [6]:
```
tracts_df = gpd.read_file('data/clinics.shp')
```

In [7]:
```
city = gpd.read_file('data/riverside_city.shp')
```

Next, we'll create a city tracts file where we join Riverside geometry to the tracts, so we get the tracts within Riverside.

In [8]:
```
city_tracts = gpd.sjoin(tracts_df, city, how='inner', op='intersects')
```

Then we'll read in a file of California tracts so we can visualize the whole state.

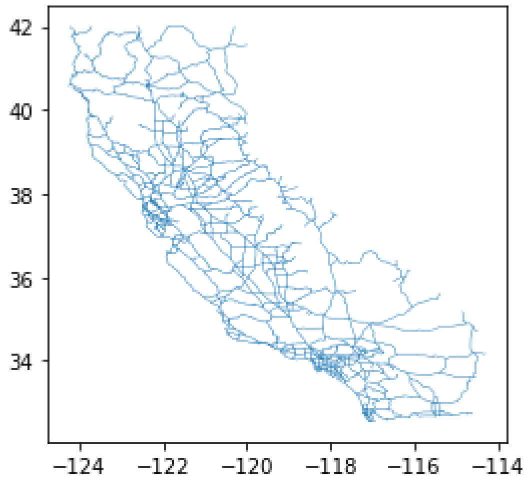
In [9]:
```
california_tracts = gpd.read_file('data/california_tracts.shp')
```

Here we'll create a buffer around the truck routes, so we can see a broader area visualized around them.

In [12]:
```
routes_buffer = routes_df.buffer(.01)
```

In [13]:
```
routes_buffer.plot()
```

Out[13]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb0677299b0>
```



It's important to change the routes_buffer file so it's a GeoDataFrame, because it was originally a GeoSeries, which is just the geometry of a GeoDataFrame. We'll also change the routes buffer CRS to the California tracts CRS, so that we can join them later.

In [14]:
```
routes_buffer = gpd.GeoDataFrame({'geometry': routes_buffer})
routes_buffer.crs = california_tracts.crs
```

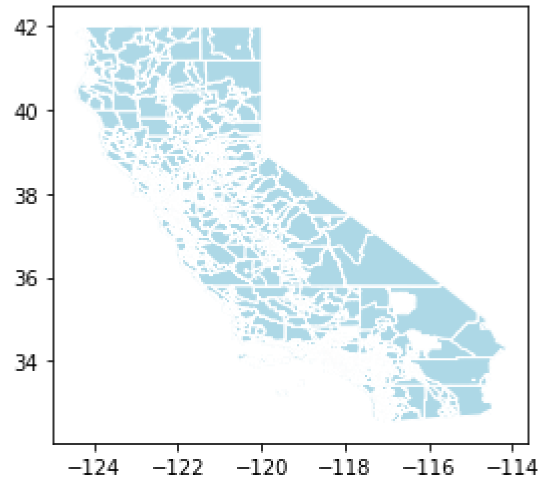
Next, we'll create ca_intersecting, a file that will bond the CA tracts with the truck routes.

In [15]:
```
ca_intersecting = gpd.sjoin(california_tracts, routes_buffer, how='inne
r', op='intersects')
```

We'll plot it with a light blue base color and white buffer, so it's easy to see.

In [17]:
```
ca_intersecting.plot(edgecolor = 'white', color = 'lightblue')
```

Out[17]: <matplotlib.axes._subplots.AxesSubplot at 0x7fb04e9af0b8>



Finally, we'll represent the California intersection data with Riverside and the truck routes. Riverside is in red. We'll also use a chloropleth map to represent the truck routes in order of length, so the longer routes are in a darker color. This shows us that the longer routes are clustered around the coast and the western part of the state, with concentrations around SoCal and NorCal urban centers. Riverside in particular is in an area with a dense concentration of longer truck routes.

In [28]:
```
ax = plt.gca()
routes_df.plot(ax=ax, column='seg_length', legend='TRUE')
ca_intersecting.plot(ax=ax, edgecolor = 'white', color = 'lightblue')
city_tracts.plot(ax=ax, color='red')
plt.show()
```