

Comparing two heating fuel types in Massachusetts counties

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Comparing Two Heating Fuel Types in Massachusetts Counties

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Abstract

My research was to explore where different fuel types are used throughout Massachusetts . Using GIS to create choropleth maps, I compared the usage of the two fuel types that are used to heat houses in Massachusetts, electricity and oil/kerosene. These two fuel types were chosen because they were used in large quantities, as opposed to other fuel types that were used in smaller quantities, such as wood and solar energy. Each map of Massachusetts is divided into counties in order to portray what regions of Massachusetts use a certain range of electricity or oil/kerosene. In addition, some of the major cities of Massachusetts have been plotted to see if they fall under regions with levels of higher fuel usage.

How GIS was used

After downloading the American Community Survey data from 5-year estimates at the county level from US Census and cleaning up the data, I added the downloaded data as a worksheet table in a blank map in ArcMap 10.1. Then, I added the USCounties layer, which has the polygon features of US counties. Using the selecting and editing tools in ArcMap 10.1, I was able to create a new layer that only has the counties of Massachusetts. I joined the downloaded table to the attribute table of the newly created layer of Massachusetts counties using a common attribute that the both tables have to join (ID number). After the join, I changed the symbology of the Massachusetts counties layer into Graduated Colors under Quantities in order to make a choropleth map for each fuel type. Lastly, I added the USCities layer, which has the point features of US cities. I used the selecting and editing tools to create a new layer of major cities in Massachusetts, which I put on top of the Massachusetts counties layer.

Results

The top right map portrays the electricity usage of Massachusetts. It shows that the middle and northeast regions of Massachusetts consume at higher levels of electricity and the west and farthest southeast regions of Massachusetts consume at lower levels of electricity. The bottom right map portrays the oil and kerosene usage of Massachusetts. It shows that the middle regions and most of the east regions of Massachusetts consume at higher levels of oil and kerosene while west regions and farthest southeast regions of Massachusetts consume at lower levels of oil and kerosene.

Discussion

It seems that in general for both electricity and oil/kerosene, the usage is highest in the eastern Massachusetts, which is where nine of the ten major cities are plotted. This strongly implies that because cities are where populations are concentrated, there are more homes in urban areas that need heating than in non-urban regions of Massachusetts. Furthermore, all the major cities fall under regions with at least middle to highest levels of usage for both electricity and oil/kerosene. Comparing the numbers in the two legends of the maps, one can see that the numbers are about twice as larger for oil/kerosene. This implies that oil/kerosene is used as a heating fuel at a higher level than electricity in Massachusetts.

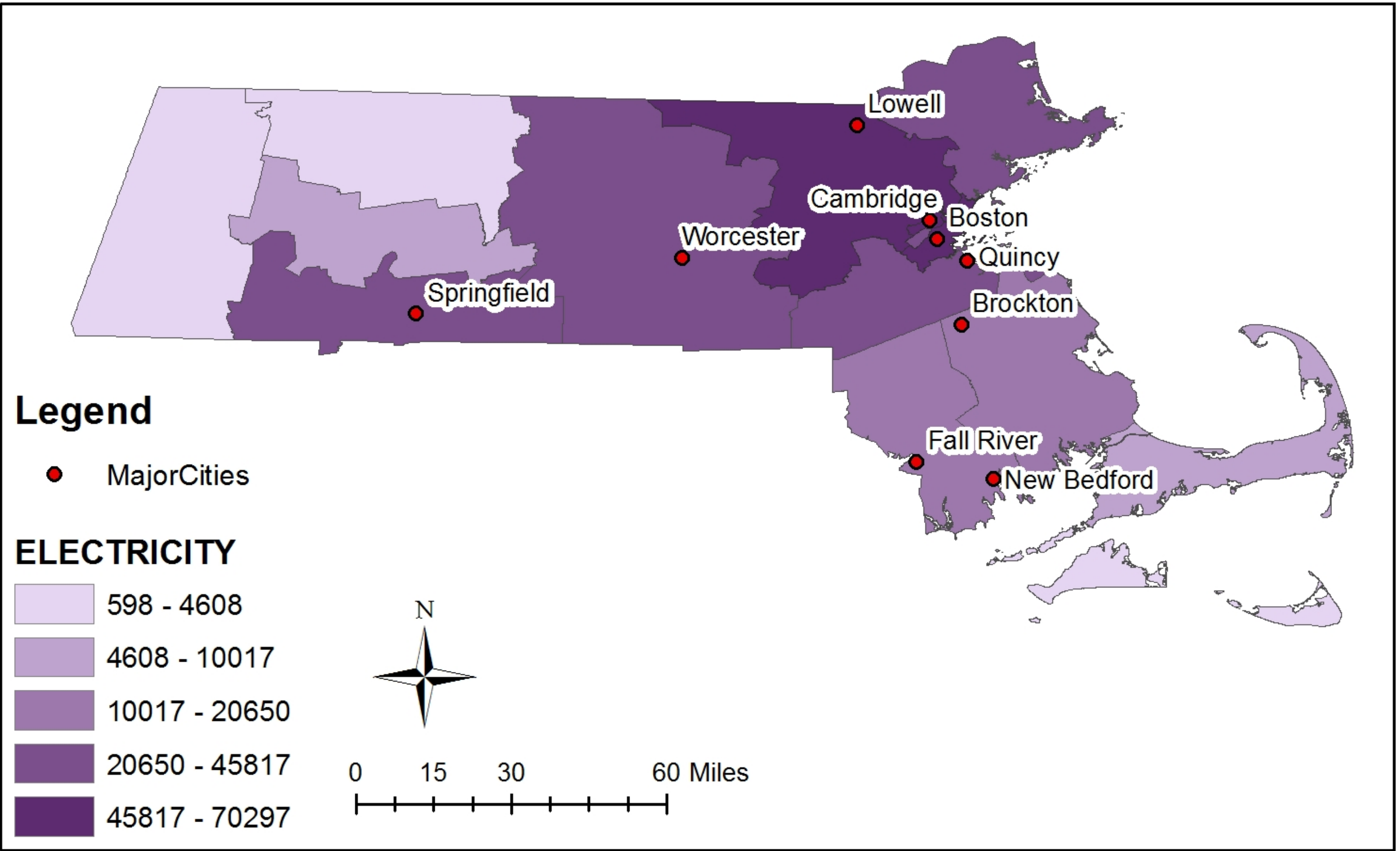
Conclusion

Through GIS, I created two choropleth maps that shows the level of variability in heating fuel usage within Massachusetts. These maps allow one to see what regions consume a certain level of a heating fuel and therefore can be useful for many purposes--for state budget management, energy management, or environmental reasons, to name a few.

Source Information

The two sources for the data used to create the maps are US Census and Esri Press. The US Census collects data about the fuel used to heat houses in the United States and was therefore used as a source for the American Community Survey data from 5-year estimates of Massachusetts at the county level. Esri Press was used as a source for the shapefiles of the counties and major cities of Massachusetts, which were used to build the map.

Electricity Usage in Massachusetts



Oil & Kerosene Usage in Massachusetts

