



Data Geographies with FRED[®]

[Diego Mendez-Carbajo, PhD](#), Senior Economic Education Specialist

GLOSSARY

Choropleth map: A map that uses shading, color, or symbols to convey a quantity or property for an area.

Compelling Question

How do data maps tell the story behind the numbers?

Description

The FRED[®] online database provides access to current data from more than 100 sources. More than half of all the data in FRED can be visualized through maps. This article describes how to interpret data maps for new data users and serves as a reference for advanced data users.

Introduction

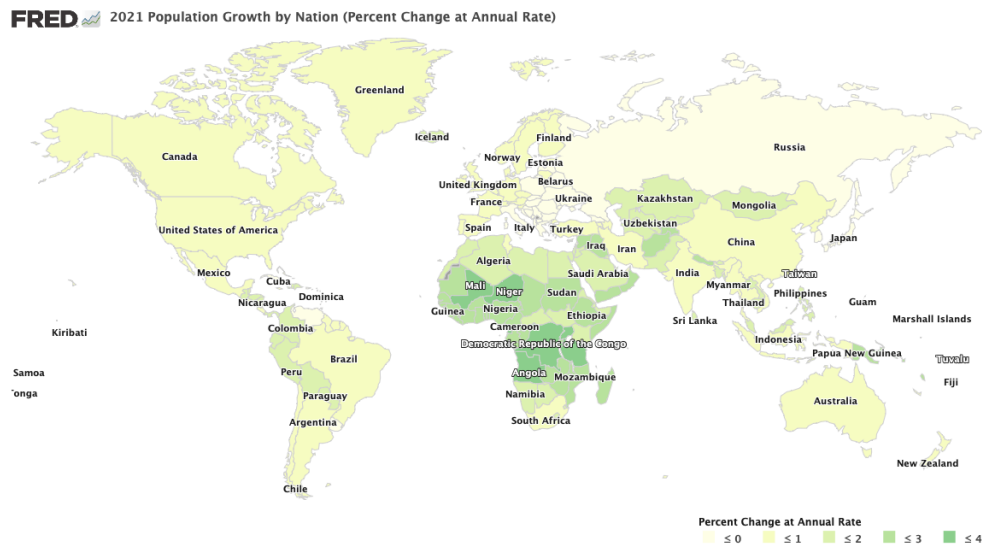
FRED users can access more than 815,000 national and international time series from its public and private data sources. When the option to view a time series graph as a map is available, the webpage displays a green “View Map” button. Clicking on the button changes the data display into a map of all the latest available data points from the same region. For example, a FRED user could examine historical house values in the US and compare the latest house values in St. Louis City, Missouri, with those in St. Louis County, Missouri.¹

FRED maps are a type of data visualization known as **choropleth maps**. The geographical areas in these maps are colored differently according to the range of data values. FRED’s default map setup organizes the data into five categories, each with a similar number of observations, and uses darker colors to represent larger numbers. For example, the default state-level FRED map of the house price index sorts the 50 states plus the District of Columbia into five color groups, from highest to lowest values, with approximately 10 observations each. This type of data visualization is like a spatial heat map.²

All maps show geographical areas, and the type of geographical contours used in data maps can shape the story behind the numbers. Small-sized nations, states, or counties with large economic footprints can be difficult to locate in a large-scale map. Changing the type of data visualization can help make those data easier to see. For example, customizing the number of color groups in a map and defining the maximum value represented in each interval can help reimagine the visualization to suit each user’s needs.³

This article describes the different data geographies currently available in FRED, which classifies them according to the reasons used to draw their boundaries: political, statistical, and economic.

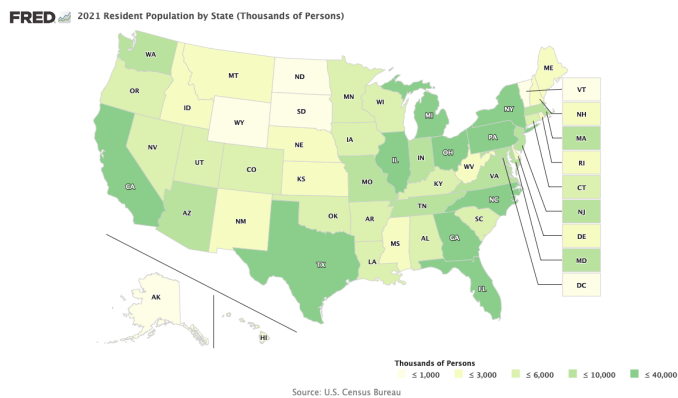
Figure 1
Population Growth by Nation



Source: World Bank

SOURCE: World Bank via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=ZbPs>, accessed January 25, 2023.

Figure 2
Resident Population by State

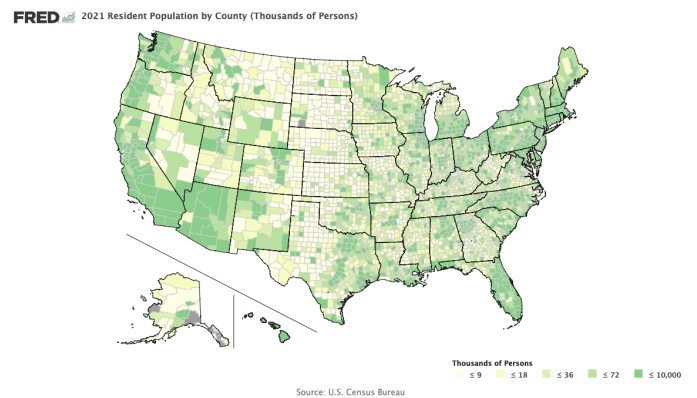


SOURCE: US Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=ZbZE>, accessed January 25, 2023.

Political Boundaries

The most familiar data geographies are those that match the contours of nations, states, or counties. These boundaries are frequently the result of long historical processes and can be imaginary or physical. The 49th parallel is an example of an imaginary boundary: It serves as the border between Canada and the contiguous United States.

Figure 3
Population by County



SOURCE: US Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=Zc4S>, accessed January 25, 2023.

The Mississippi river is an example of a physical boundary: It courses along 10 states and serves to mark parts of their borders.

Each political unit has distinct governments, which exercise authority over the territory and the people living in it. International agreements for common data collection methodologies allow countries to compare statistical

information.⁴ Organizations such as the World Bank, the International Monetary Fund, and the Organisation for Economic Co-operation and Development are sources of national-level data in FRED (Figure 1). These organizations aggregate data from official national sources and produce their own reports.

In the United States, the Census Bureau is the principal official agency responsible for producing data about the American people and economy. The US Constitution

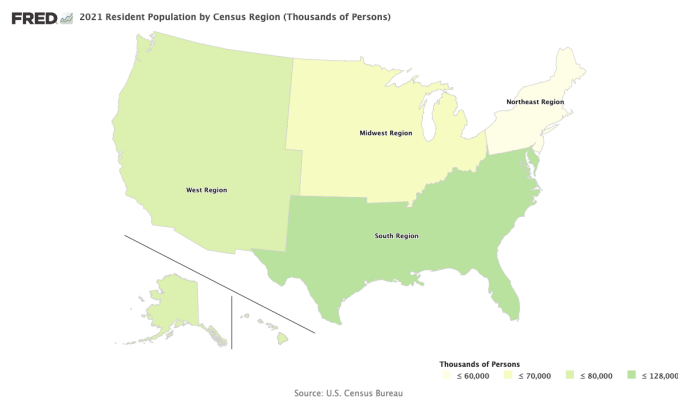
provides the mandate for the statistical work of the Census. Besides its well-known 10-year population census, the organization also conducts a 5-year economic census and releases new data every year through its American Community Survey. The Census is the single largest source of data in FRED, reporting statistics at the state level (Figure 2) and county level (Figure 3).⁵

Statistical Boundaries

The Census organizes the 50 states into four regions: Northeast, Midwest, South, and West (Figure 4). Each of those Census regions is subdivided into two or more divisions. There is a total of nine Census divisions: New England, Middle Atlantic, East North Central, West North

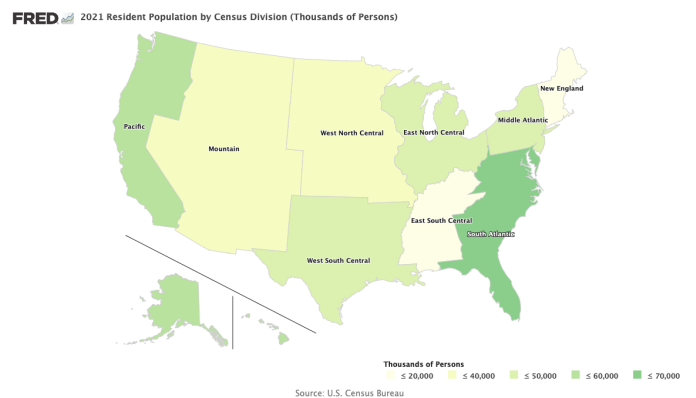
Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific (Figure 5). Those areas were drawn more than a century ago to facilitate the presentation and analysis of statistical information.⁶

Figure 4
Resident Population by Census Region



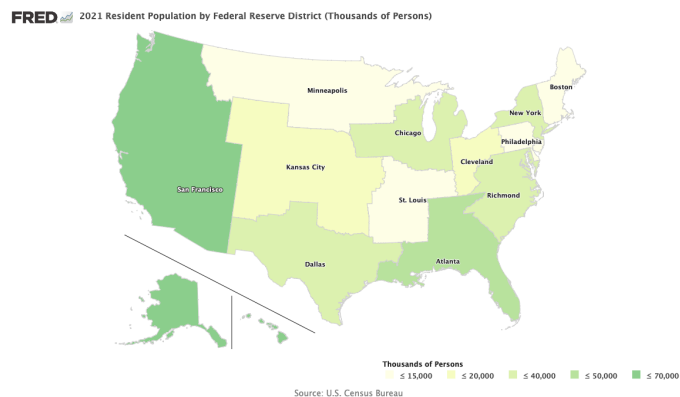
SOURCE: US Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=Zc2d>, accessed January 25, 2023.

Figure 5
Resident Population by Census Division



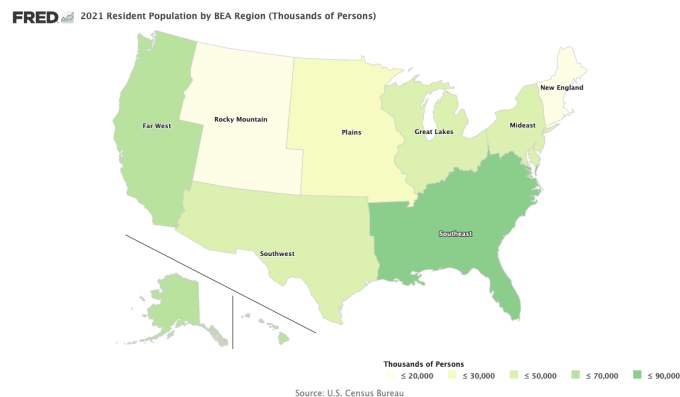
SOURCE: US Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=Zc2U>, accessed January 25, 2023.

Figure 6
Resident Population by Federal Reserve District



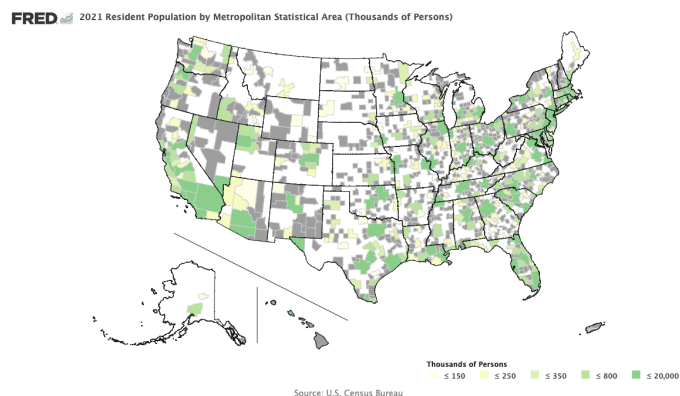
SOURCE: US Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=Zc0W>, accessed January 25, 2023.

Figure 7
Resident Population by BEA Region



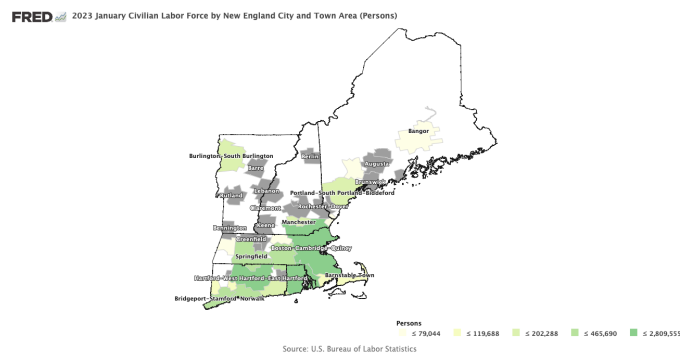
SOURCE: US Bureau of Economic Analysis (BEA) and Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=Zc1C>, accessed January 25, 2023.

Figure 8
Resident Population by Metropolitan Statistical Area



SOURCE: US Census Bureau via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=Zc4f>, accessed January 25, 2023.

Figure 9
Civilian Labor Force by New England City and Town Area



SOURCE: US Census Bureau and Bureau of Labor Statistics via FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?m=11HDr>, accessed January 25, 2023.

Economic Boundaries

Several data geographies in FRED represent the boundaries of regional economic activity. The contours of the 12 Federal Reserve Districts represent the administrative boundaries for providing central banking services on a regional basis (Figure 6). The 12 Federal Reserve Banks are one of three key entities in the Federal Reserve System (along with the Board of Governors and the Federal Open Market Committee). The District boundaries for each Bank were created in 1914, and their areas reflect the nation’s population at that time.⁷

The US Bureau of Economic Analysis (BEA) outlines regions that represent groupings of states with similar economic and social conditions (Figure 7). The BEA organizes the 50 states into eight regions: This classification was drawn after the 1950 Census to group states with similar economic and social indicators.⁸

The Census outlines metropolitan statistical areas (MSAs), which represent groupings of counties, cities, and towns with a high degree of social and economic integration, such as commuting ties (Figure 8). The Census defines MSAs as groups of communities where a core urban

area with substantial population has a high degree of economic and social integration with nearby communities.⁹ As of March 2020, there are 384 MSAs, with each one named after the largest city, or cities, in the area. The definitions and boundaries of MSAs are revised periodically. The Census also defines smaller urban clusters and names them *micropolitan* statistical areas. It currently identifies 543 of them. At the time of this writing, data about those areas are not available in FRED.

The Census also defines metropolitan and micropolitan statistical areas in its New England division, naming them New England city and town areas (NECTAs) (Figure 9). These include the states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.¹⁰ As of March 2020, there are 21 metropolitan NECTAs. FRED has data on all those geographies, and users are able to display them as FRED maps.

Resident population and economic conditions change over time, so several of the economic geographies described above are periodically revised. Statistical research can be used to draw alternative boundaries to regional economic data geographies that group similar states.¹¹

Conclusion

The geographical areas drawn in FRED maps represent political, statistical, or economic boundaries. Political and statistical boundaries might show little or no change over time. However, economic and population growth can make economic borders lose much of their original meaning. Statistical research of economic data can be used to define alternative boundaries in maps.

In that light, the outlines of some economic areas shown in FRED maps are periodically revised and redrawn by the organizations collecting the data. As with any other data revision or update, FRED maps will reflect those data geography changes.¹²

Finally, as FRED continues to increase its repository of international data, the boundaries of supranational political or economic organizations, such as the European

Union, are likely to be added to FRED maps. FRED users can look forward to transforming data from even more time series into choropleth maps, which provide colorful visualizations of data from all over the globe. ■

Notes

¹ For a brief introduction to the history of those two similarly named counties, see <https://fredblog.stlouisfed.org/2023/02/racial-dissimilarity-in-st-louis-missouri/>.

² To learn more about the difference between fractile intervals and equal intervals, see <https://fredblog.stlouisfed.org/2022/08/a-lesson-in-mapping-population-data/>.

³ For an example of customized FRED maps showing only two data intervals, see <https://fredblog.stlouisfed.org/2022/12/using-fred-maps-to-look-at-regional-gdp/>.

⁴ See the following for more on the set of international principles governing official statistics: “Fundamental Principles of National Official Statistics.” United Nations Statistics Division, January 2014; <https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx>.

⁵ See the following for more on the work conducted by the US Census: “What We Do.” US Census Bureau, revised August 2022; <https://www.census.gov/about/what.html>.

⁶ See the following for more on the history of US Census regions and divisions: “Regions and Divisions.” US Census Bureau, revised December 2022; https://www.census.gov/history/www/programs/geography/regions_and_divisions.html.

⁷ For a discussion of population data in each Federal Reserve District, see <https://fredblog.stlouisfed.org/2022/08/a-lesson-in-mapping-population-data/>.

⁸ See the following for more on the process of drawing BEA regions: “Statistical Groupings of States and Counties –Some Alternate Approaches to State Groupings.” US Department of Commerce, November 1994; <https://www2.census.gov/geo/pdfs/reference/GARM/Ch6GARM.pdf>.

⁹ See the following for more on delineating metropolitan and micropolitan statistical areas: “Our Surveys & Programs / Metropolitan and Micropolitan / About.” US Census Bureau, revised November 2021; <https://www.census.gov/programs-surveys/metro-micro/about.html>.

¹⁰ See the following for more on the geographic levels used for the economic census: “Our Surveys & Programs / Economic Census / Guidance for Economic Census Geographies Users / Geographic Levels.” US Census Bureau, revised October 2021; <https://www.census.gov/programs-surveys/economic-census/guidance-geographies/levels.html>.

¹¹ Crone, Theodore M. “An Alternative Definition of Economic Regions in the United States Based on Similarities in State Business Cycles.” *Review of Economics and Statistics*, November 2005, 87(4), pp. 617-26; <https://www.jstor.org/stable/40042880>.

¹² Mendez-Carbajo, Diego. “Data Revisions in FRED®.” Federal Reserve Bank of St. Louis *Page One Economics* Data Primer, August 2022; <https://research.stlouisfed.org/publications/page1-econ/2022/08/01/data-revisions-with-fred>.