

NEBRASKA DATA USERS 2021

CONFERENCE SERIES

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#NebraskaByTheNumbers

#DataUsersNE

**Maps for
Information
Sharing:
Pros and Cons**



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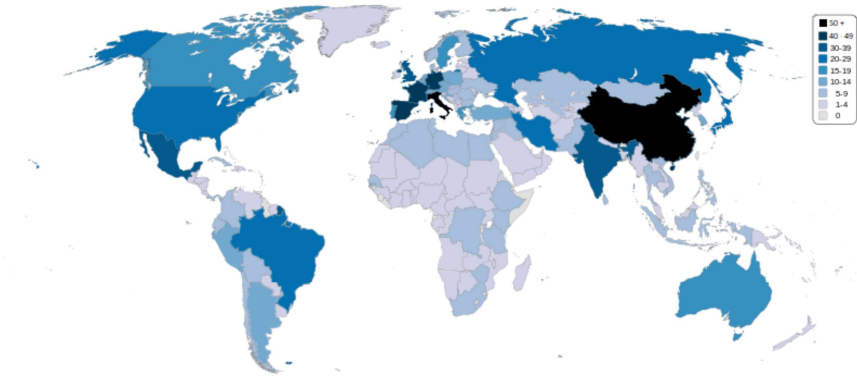
Choropleth Maps: Advantages, Disadvantages, and Workarounds

- Choropleth maps use differences in shading, coloring, or placement of symbols within predefined areas to indicate the data value in those areas.
- AKA: thematic maps, blot maps, regional maps, filled-in maps, or patch maps.
- It is the most common type of map we create and use at CPAR.

Advantages to using choropleth maps

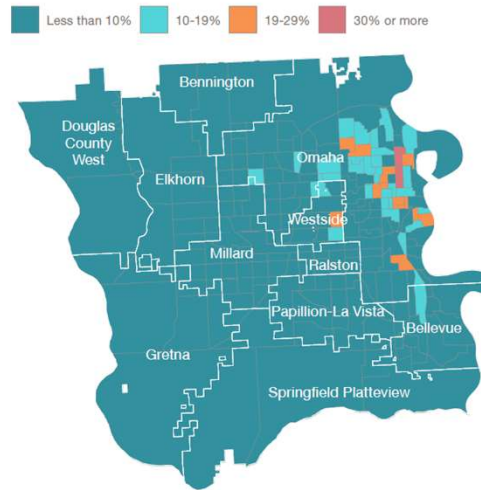
- Can be done at any scale.

Small scale showing a large geographic area



Large scale
showing a
small geographic
area

Percent of Occupied Housing Units with No Vehicle Available,
Census Tracts, Douglas and Sarpy Counties, Nebraska, 2018



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates, 2014-2018

Advantages to using choropleth maps

- Can be done at any scale.
- Can examine data at many levels of analysis.
 - Local, state, national, global

This means the data can be thought about in many ways, from general overall patterns to the detection of details.

Advantages to using choropleth maps

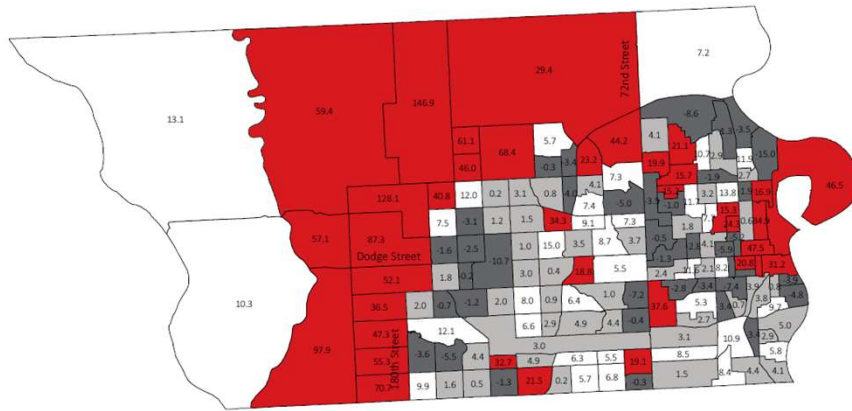
- Can be done at any scale.
- Can examine data at many levels of analysis.
 - Local, state, national, global
- **Helpful in finding hot spots.**

Users can detect relationship between the data and geographic location. A choropleth map lets a user know how their area compares with other areas. This is usually the main goal when we create a choropleth map at CPAR, that is, to compare counties, districts, school districts, census tracts, ZIP codes, etc.

Where are the hot spots?

Percent Change in Population for Douglas County Census Tracts from 2010 Census to 2020 Census

Decline (39)
 Growth of less than 5% (45)
 Growth between 5% and 15% (35)
 Growth of 10% or more (37)



Advantages to using choropleth maps

- Can be done at any scale.
- Can examine data at many levels of analysis.
 - Local, state, national, global
- Helpful in finding hot spots.
- **Common and familiar to users, making data easy to understand.**

This is the most important advantage. This familiarity means the viewer can quickly understand what is being represented without the need for an extensive legend or explanation about symbology.

Disadvantages to using choropleth maps

- Does not provide detailed information or perspective on any one area's internal conditions.
 - Workaround: Make the map interactive.

One way to solve lack of detail is to make the map interactive, for example, by creating a dashboard in Tableau that includes tool tips or allows the user to drill down for more information. This is not always feasible, especially if the map is to be included in a printed document.

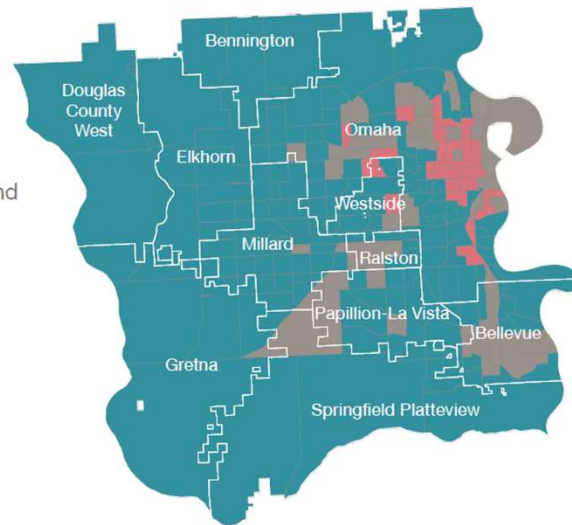
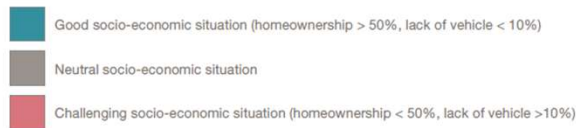
Disadvantages to using choropleth maps

- Does not provide detailed information or perspective on any one area's internal conditions.
 - Workaround: Make the map interactive.
- Limited to showing one variable at a time.
 - Workaround: Combine values or create an index.

A combined analysis can be especially powerful because the sum is often greater than its parts.

Workaround: Combine values

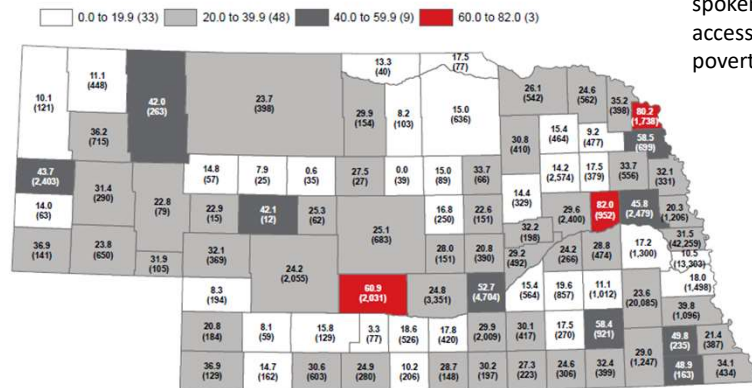
Socio-economic Situation Based on Homeownership and Lack of Vehicle, Census Tracts, Douglas and Sarpy Counties, Nebraska, 2018



In this example, we combined the variables of homeownership and vehicle ownership. A low rate of both homeownership and vehicle ownership indicates an area of a challenging socio-economic situation.

Workaround: Create an index

Need Index and (Population Under Age 5)
Nebraska Counties | 2019



Data includes rates of school enrollment, language spoken at home, internet access, education attainment, poverty and housing costs.

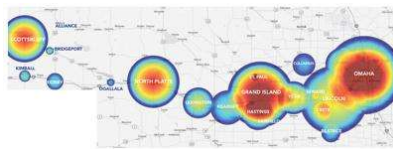
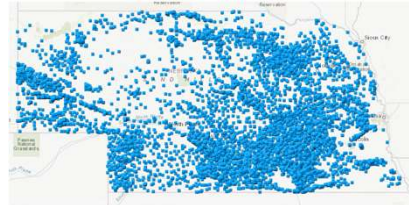
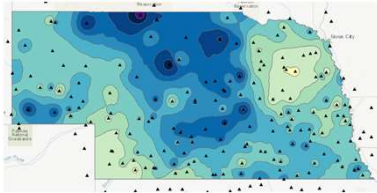
In this example, we mapped a composite of eight variables. The client wanted to identify areas of need for childcare services. The data used includes rates of school enrollment, language spoken at home, internet access, education attainment, poverty and housing costs. A statistical formula was applied to create a need index. This index value was then mapped so the areas of need are easier to identify than if the user had to interpret this from eight separate maps each with one of the original variables.

Disadvantage to using choropleth maps

- Does not provide detailed information or perspective on any one area's internal conditions.
 - Workaround: Make the map interactive.
- Limited to showing one variable at a time.
 - Workaround: Combine values or create an index.
- **Can give false impression of abrupt change at the boundaries.**
 - Workaround: Use a different type of map, such as an isopleth, heat, point, or grid square map.

If trying to compare specific areas, such as Nebraska counties, having an abrupt change at the boundaries is not a drawback. It is exactly what you want to show.

Workaround: Use a different type of map



However, if you want to map a gradual change over space, it may be better to use a different type of map, such as an isopleth map, heat map, or grid square map. It might be helpful to overlay some boundaries over the other map to give context.

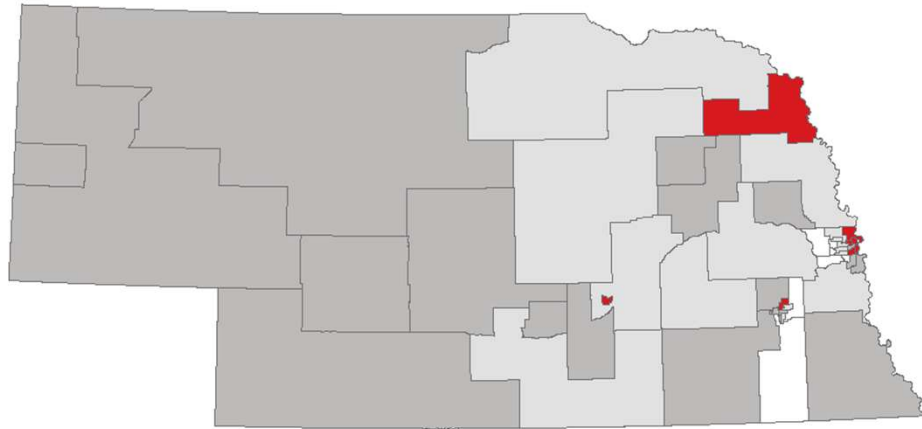
Disadvantage to using choropleth maps

- Big differences in the size of areas can lead to misinterpretation of data.

The biggest disadvantage of a choropleth map is that the areas are not uniform, often with big size differences among the areas. This can create misinterpretation if the larger areas are given more importance simply because they are larger and have greater visual impact (that is, the Alaska effect). If the smaller areas are very small, it may be hard for the user to distinguish the borders between areas or determine the color of an area. For example, a dark color in a small area could get lost amid lighter colors of surrounding large areas. The size disparity can make it hard to label the map.

This is a frequent issue when mapping data for Nebraska Unicameral districts and census tracts. Each solution requires compromises or trade-offs. No one solution is the best for all situations.

Nebraska Legislative Districts

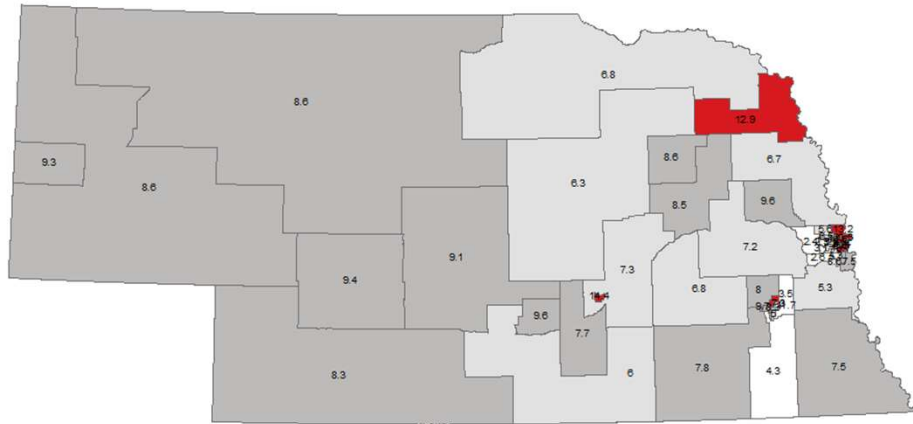


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A choropleth map of the Nebraska Legislative Districts illustrates how difficult it can be to distinguish the districts in the metro areas of the state.

Nebraska Legislative Districts



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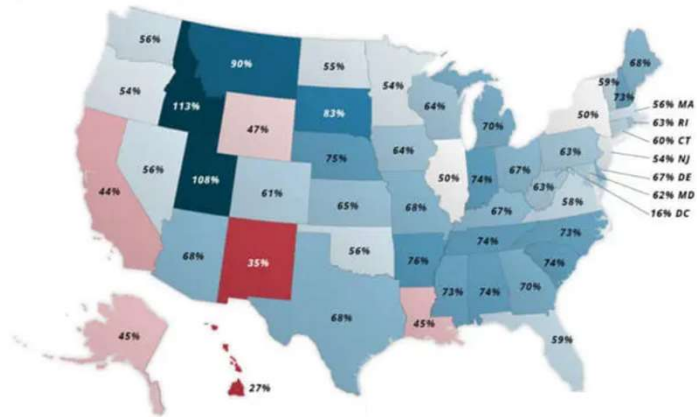
When labels are added, it is even more difficult.

Disadvantage to using choropleth maps

- Big differences in the size of areas can lead to misinterpretation of data.
 - **Workaround: Label placement and use of leader lines**

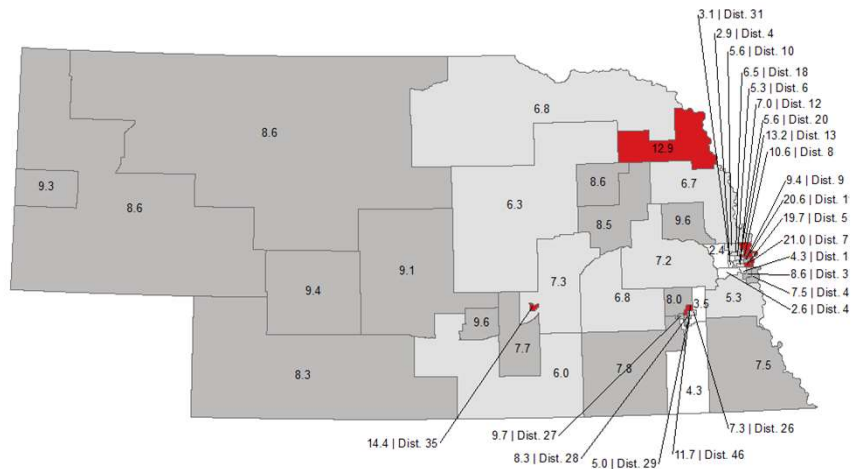
Workaround:
Leader Lines:
United States

Figure 1: Employment Recovery Strongest in Mountain-West



We commonly see leader lines used on a map of the United States, for the small states in New England.

Workaround: Leader Lines: Unicameral Districts



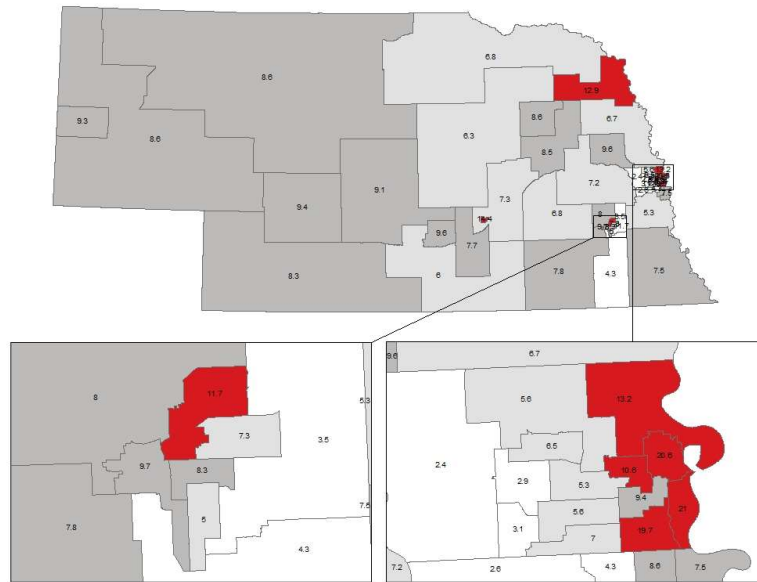
This same technique can be used for the small districts in the urban areas of Nebraska.

Disadvantage to using choropleth maps

- Big differences in the size of areas can lead to misinterpretation of data.
 - Workaround: Label placement and use of leader lines
 - Workaround: **Inset map**

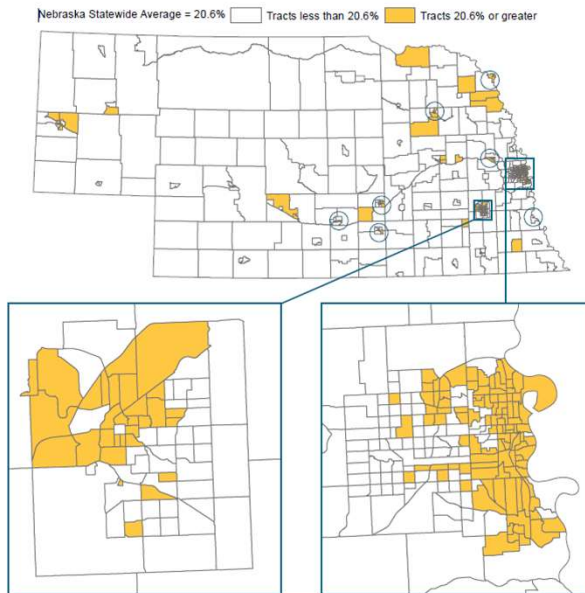
An inset map is a smaller map (at a larger scale) featured on the same page as the main map. It is used to show more detail of a particular area.

Workaround:
Inset map:
Nebraska
Legislative
Districts



By including inset maps that zoom into the urban areas of Nebraska, the user can see the districts in those areas. Geographic reference is maintained.

Workaround:
Inset map:
Nebraska
Census Tracts



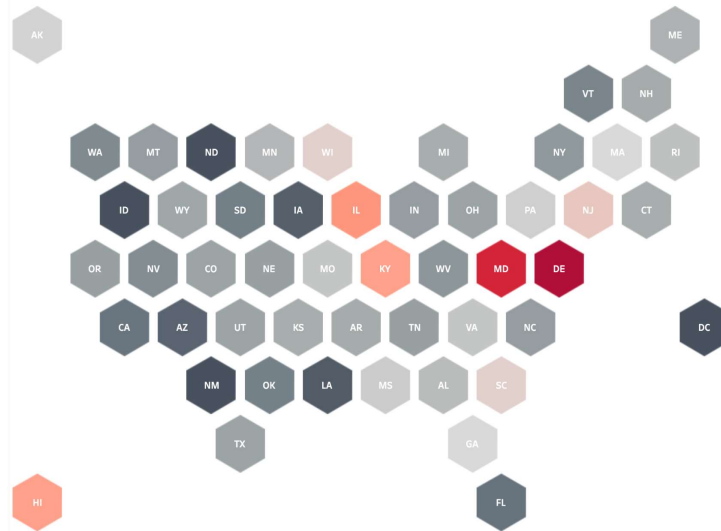
The same technique works well when presenting data for census tracts in Nebraska.

Disadvantage to using choropleth maps

- Big differences in the size of areas can lead to misinterpretation of data.
 - Workaround: Label placement and use of leader lines
 - Workaround: Inset map
 - Workaround: **Grid tiles/hexagon maps**

Grid tile maps are technically a type of chart, where geographic areas are represented by equal sized shapes — often a hexagon — and arranged to mimic a map.

Workaround: Hexagon map: United States



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We frequently see hexagon maps of the United States. This technique makes it easy to include Alaska, Hawaii, and the District of Columbia. The color and label of each area are easy to see and the data are not skewed by visual impact. However, geographic context and location are lost because the states are not positioned in accurate relation to each other. In the example shown, Missouri appears directly east of Nebraska and Utah appears to border Nebraska.

Workaround: Hexagon map: Nebraska

Percent of Population Aged 18 to 64 Years for Nebraska Legislative Districts: 2008-2012



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Data for Nebraska Legislative Districts can also be presented in a hexagon map, arranged in the shape of the state. Again, the geographic location of the districts is skewed. For example, districts 10, 18, and 13 are not located on the north border of the state; but rather in the Omaha metro area. Using this type of visualization requires a trade-off between geographic accuracy and readability.

Discussion. Questions?

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