

Mapping the Great Recession by State-level Employment Changes

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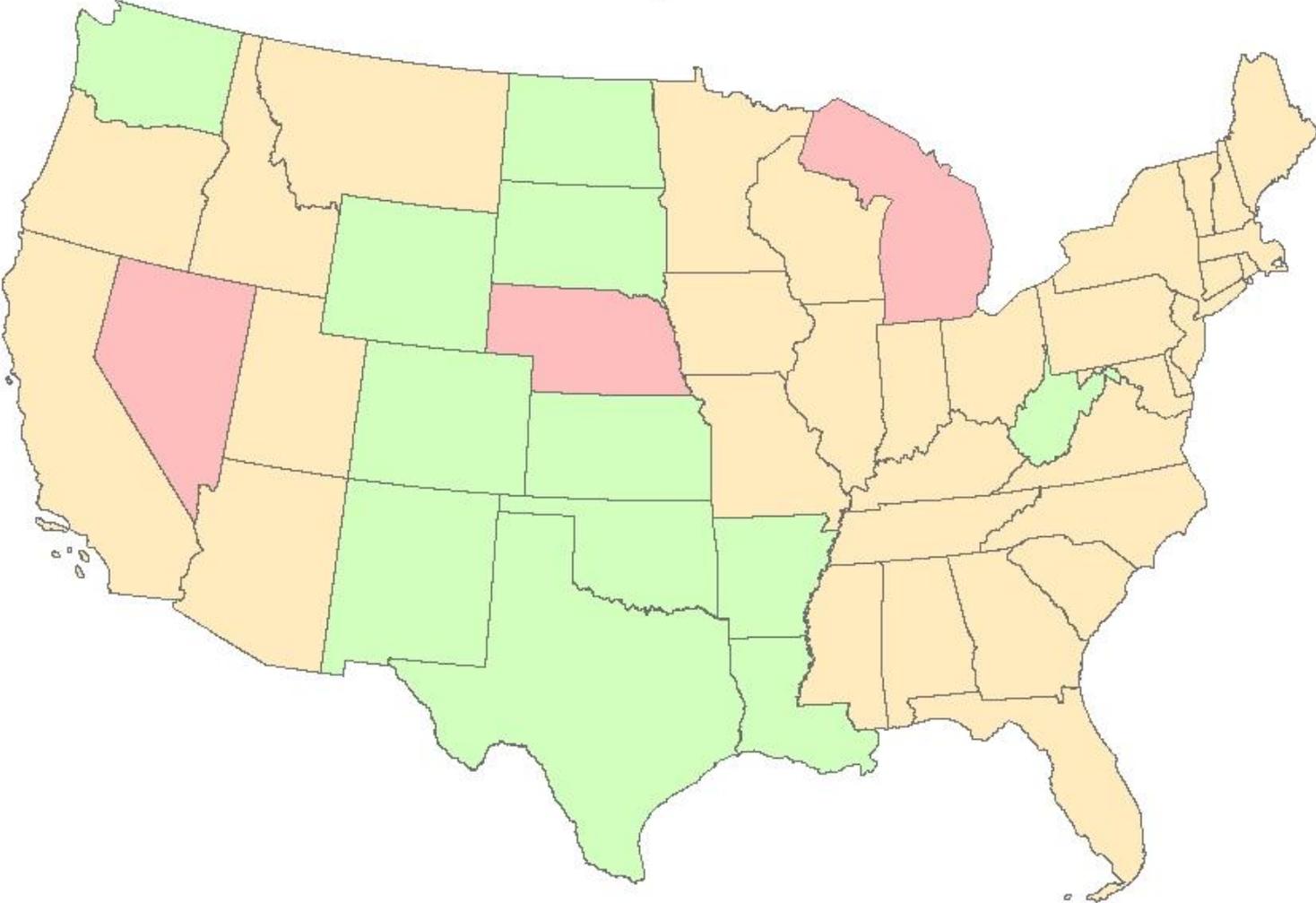
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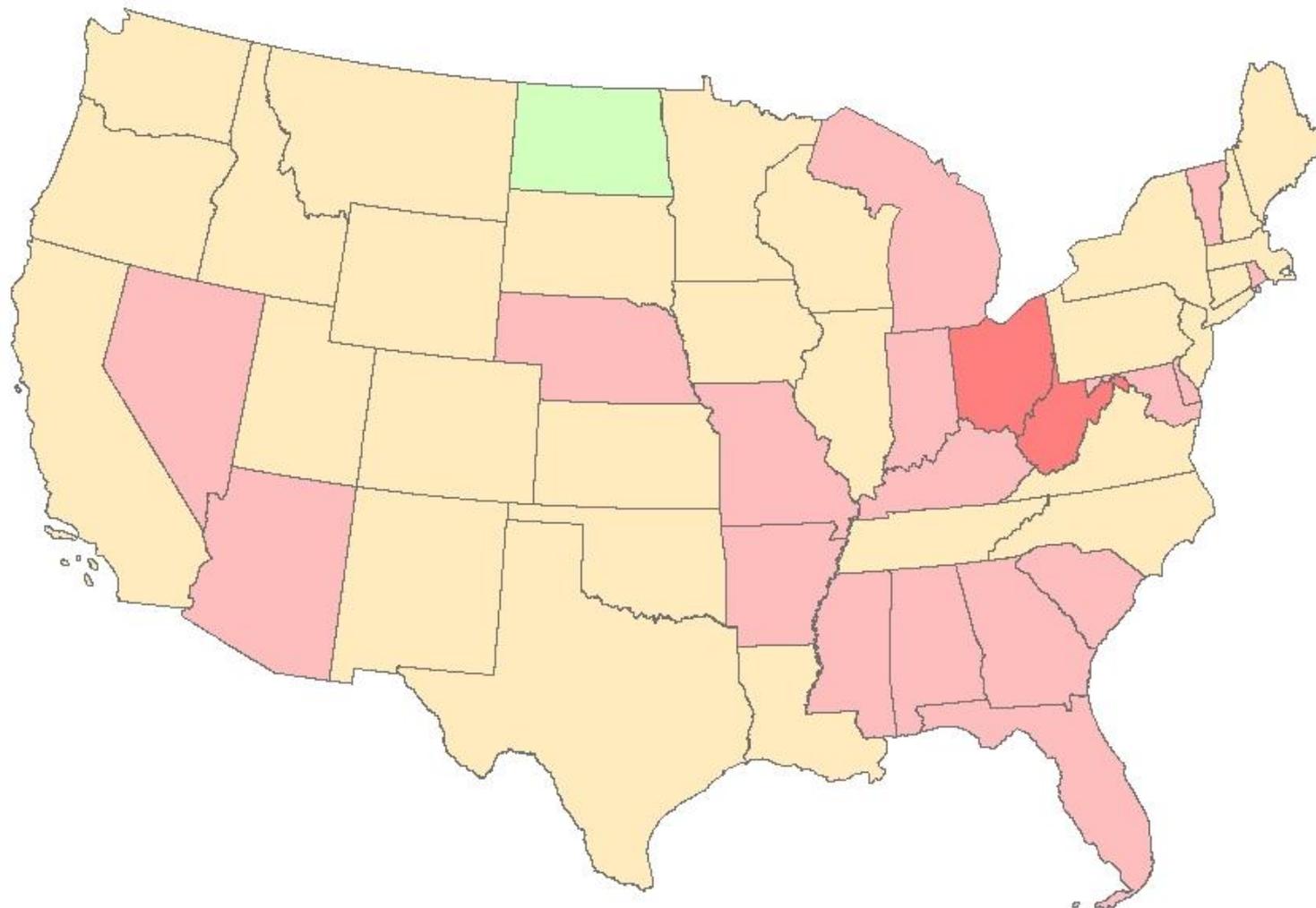
The First Law of Geography

- The First Law of Geography (Waldo Tobler)
- "Everything is related to everything else, but near things are more related than distant things."
- This presentation applies this law to percentage changes in employment during the recession 2007-2010
- Watch the following slides for similarities among nearby states

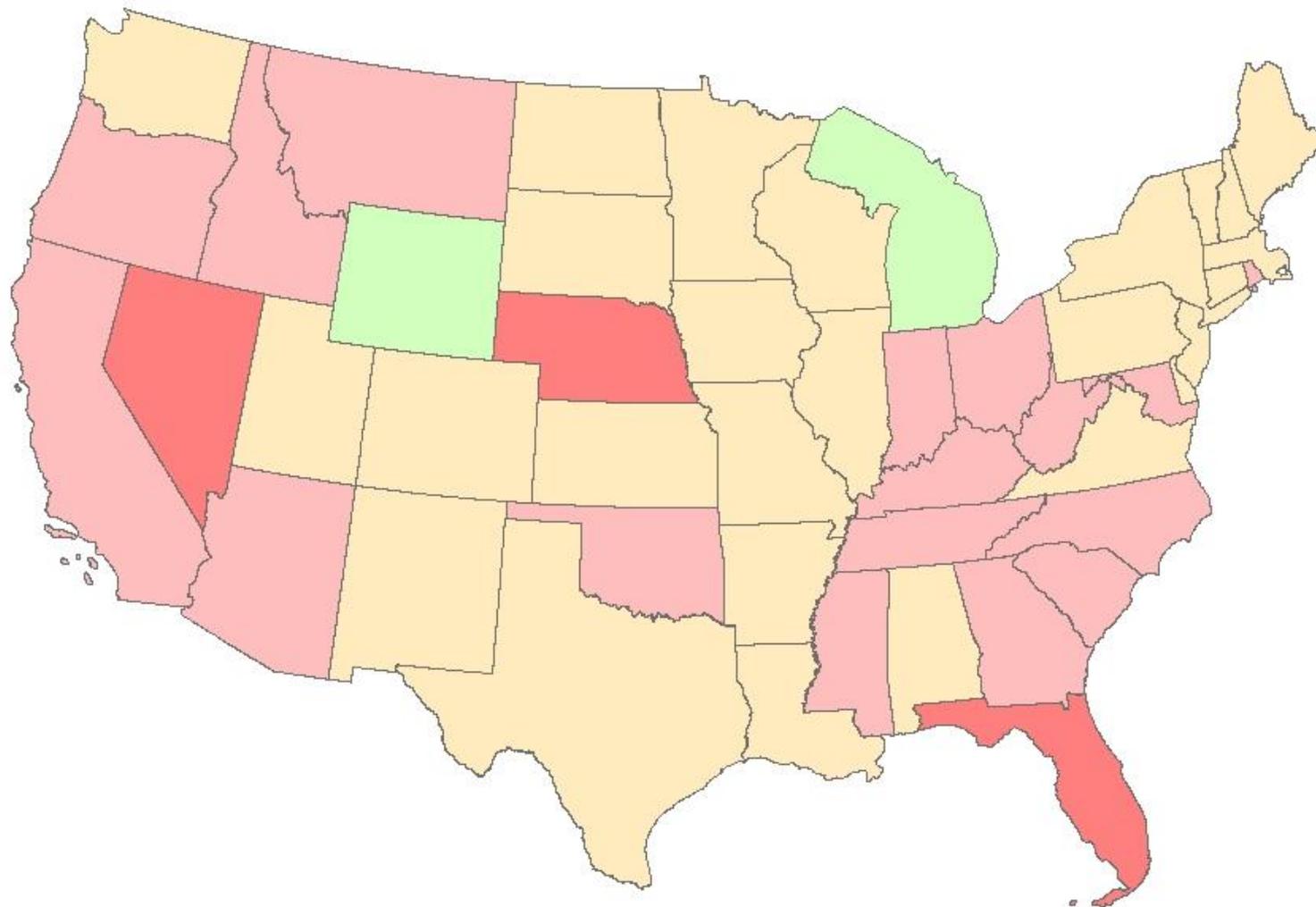
Employment Change (Percent) February 2008



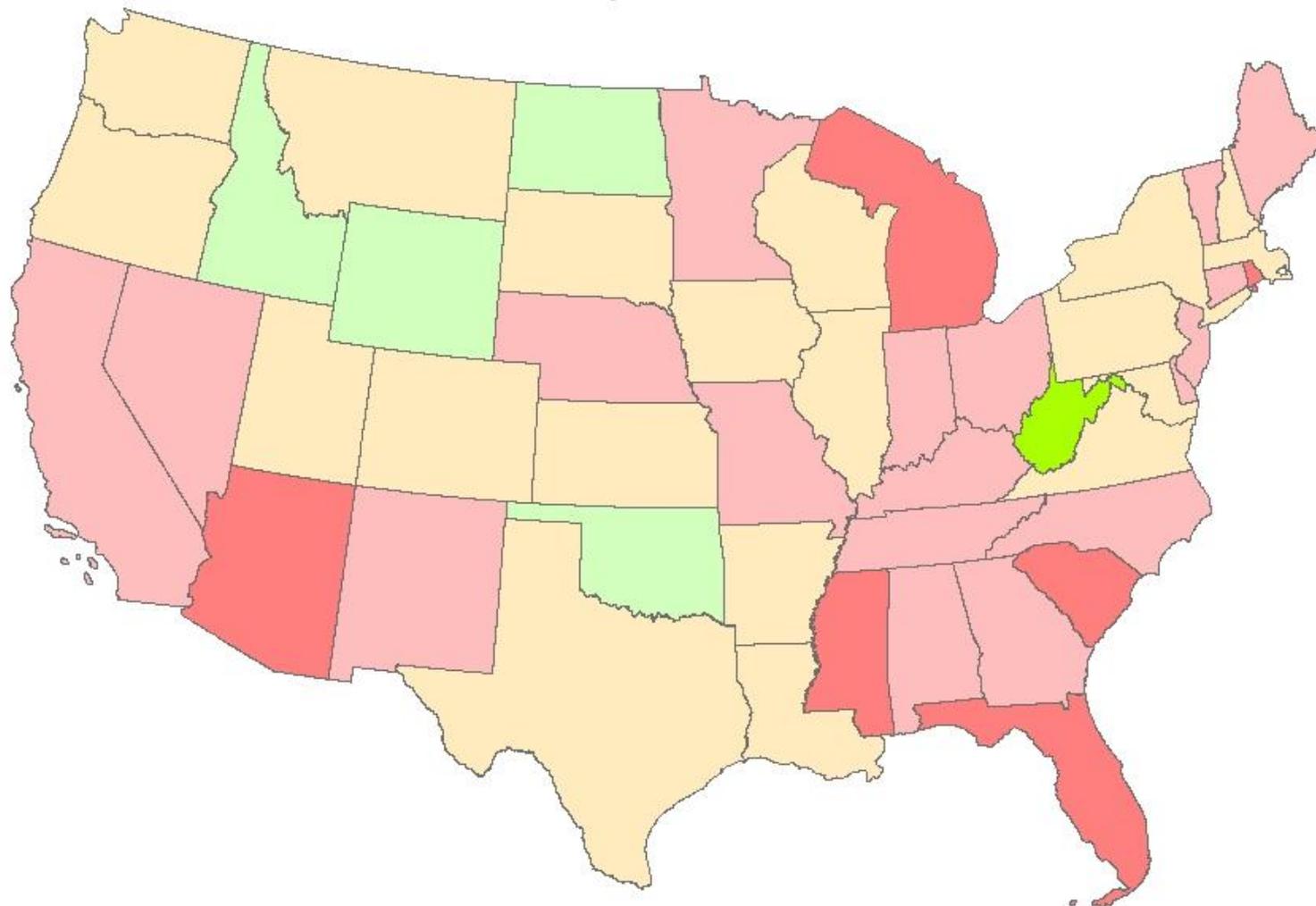
Employment Change (Percent) March 2008



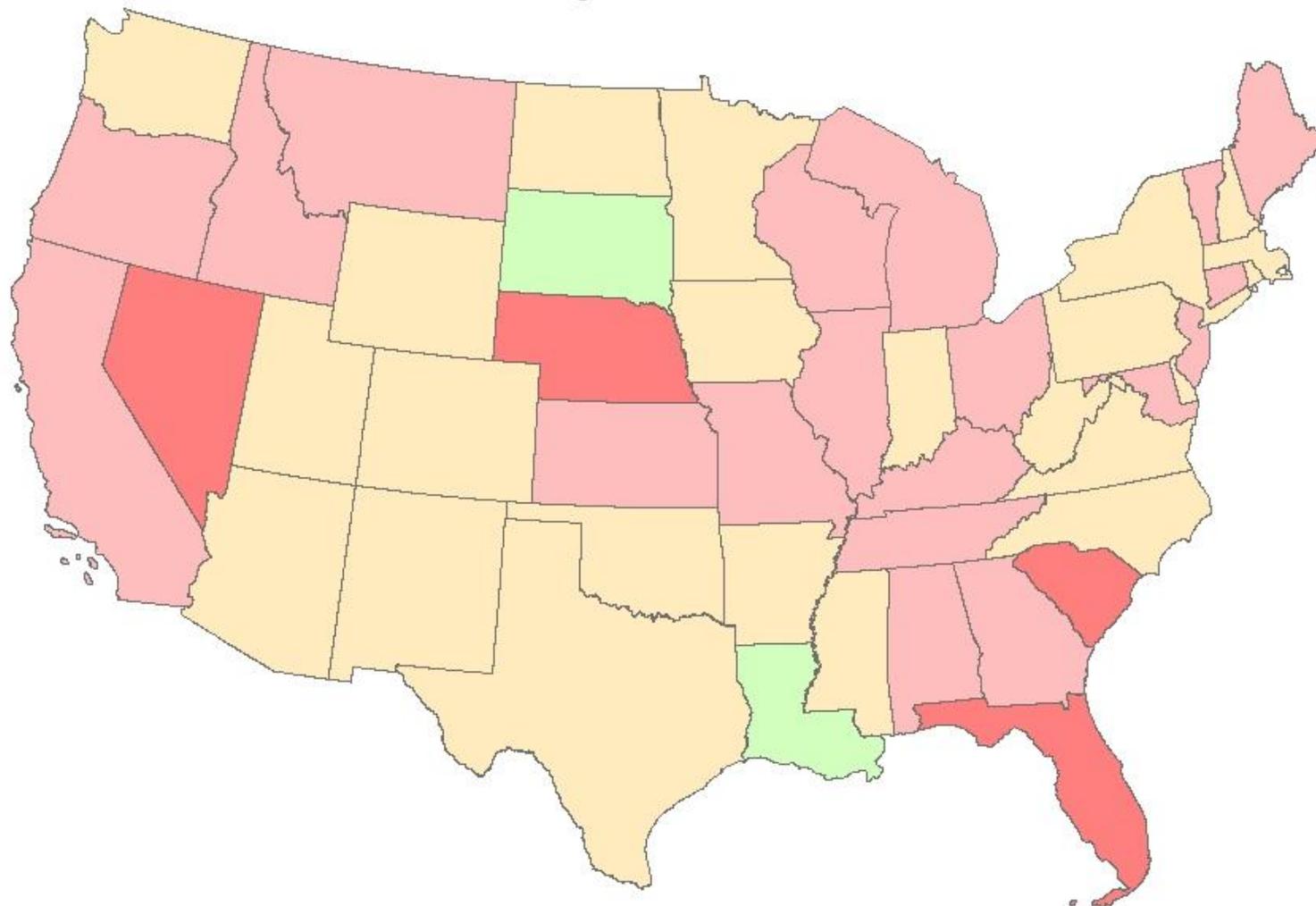
Employment Change (Percent) June 2008



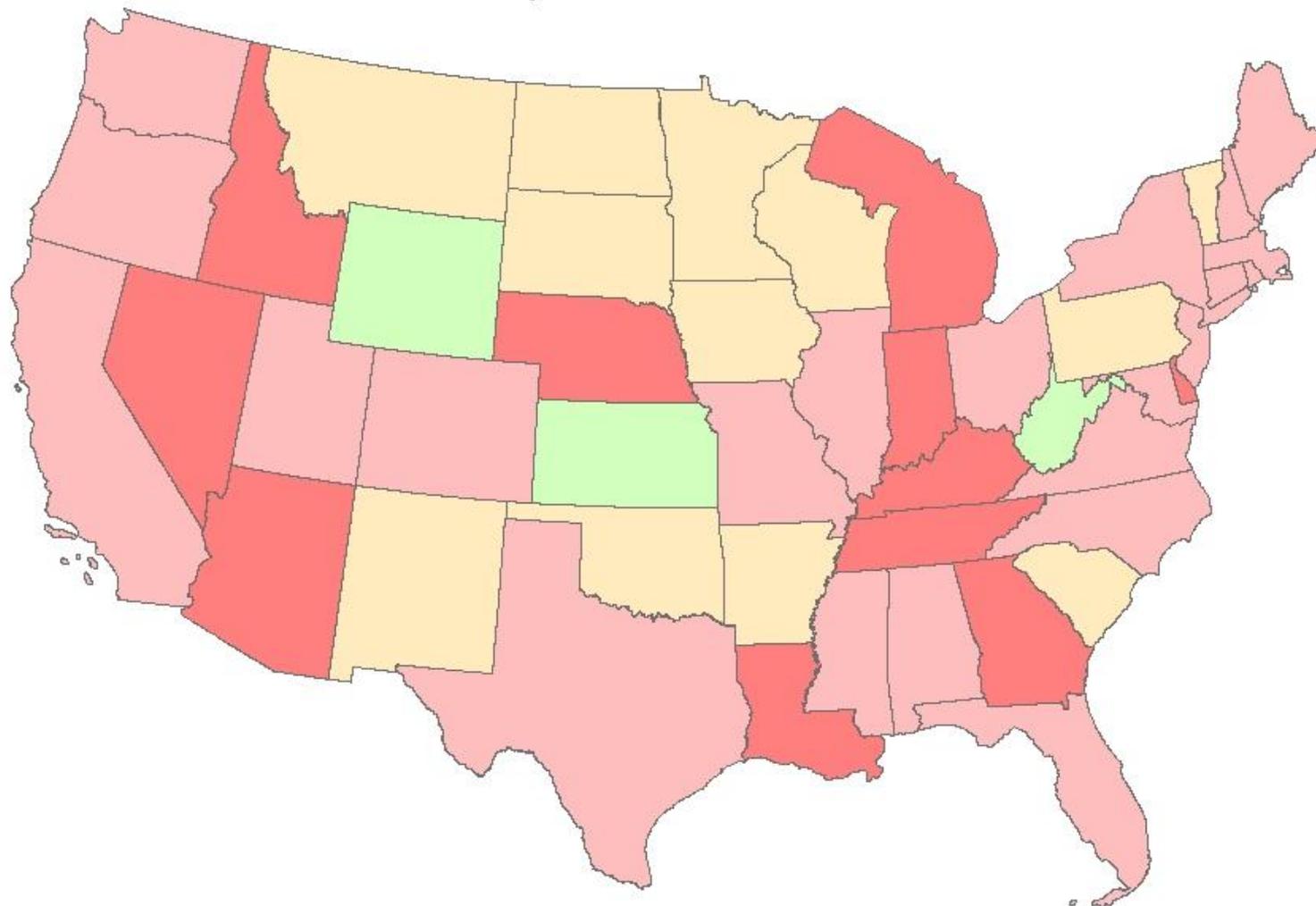
Employment Change (Percent) July 2008



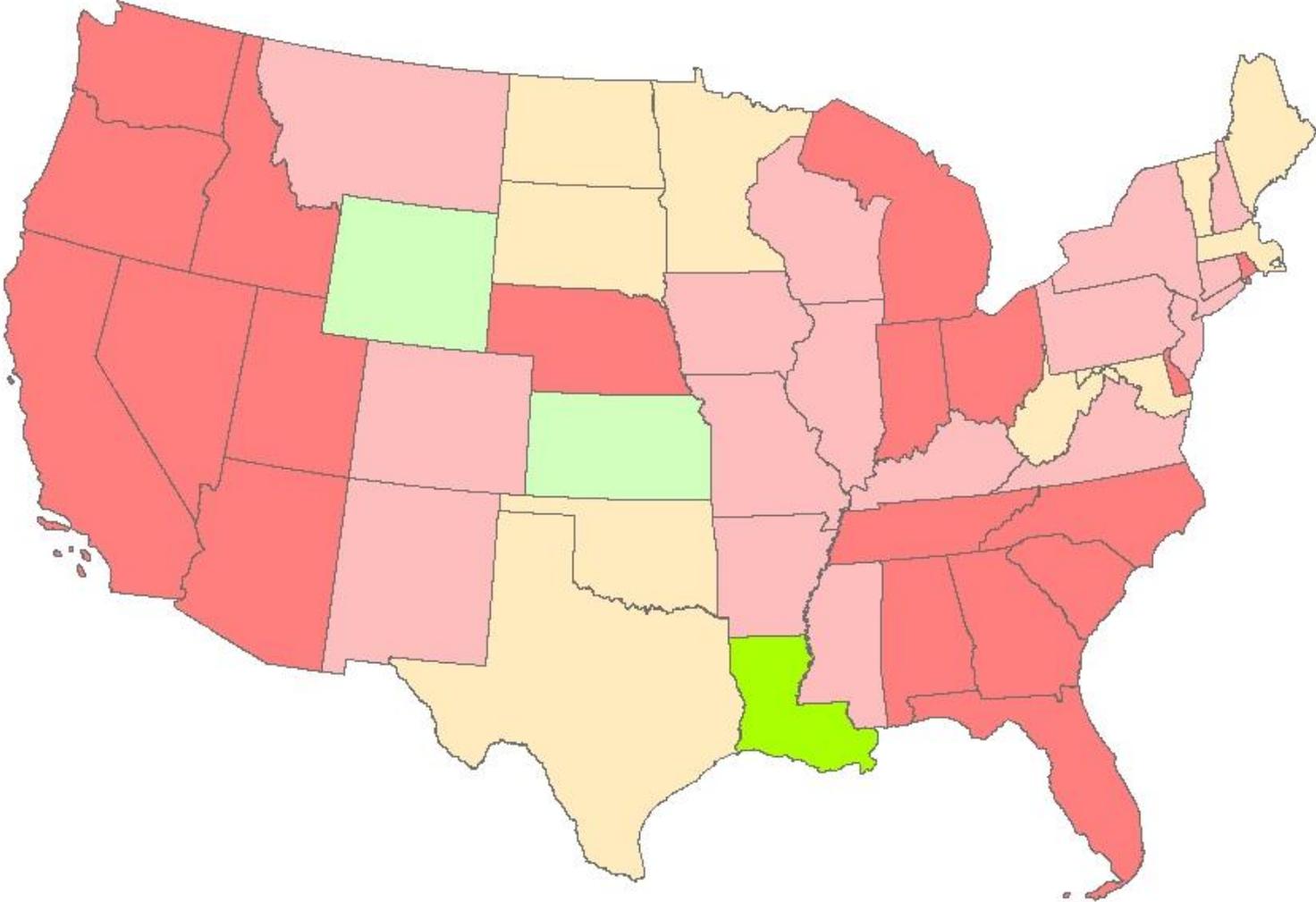
Employment Change (Percent) August 2008



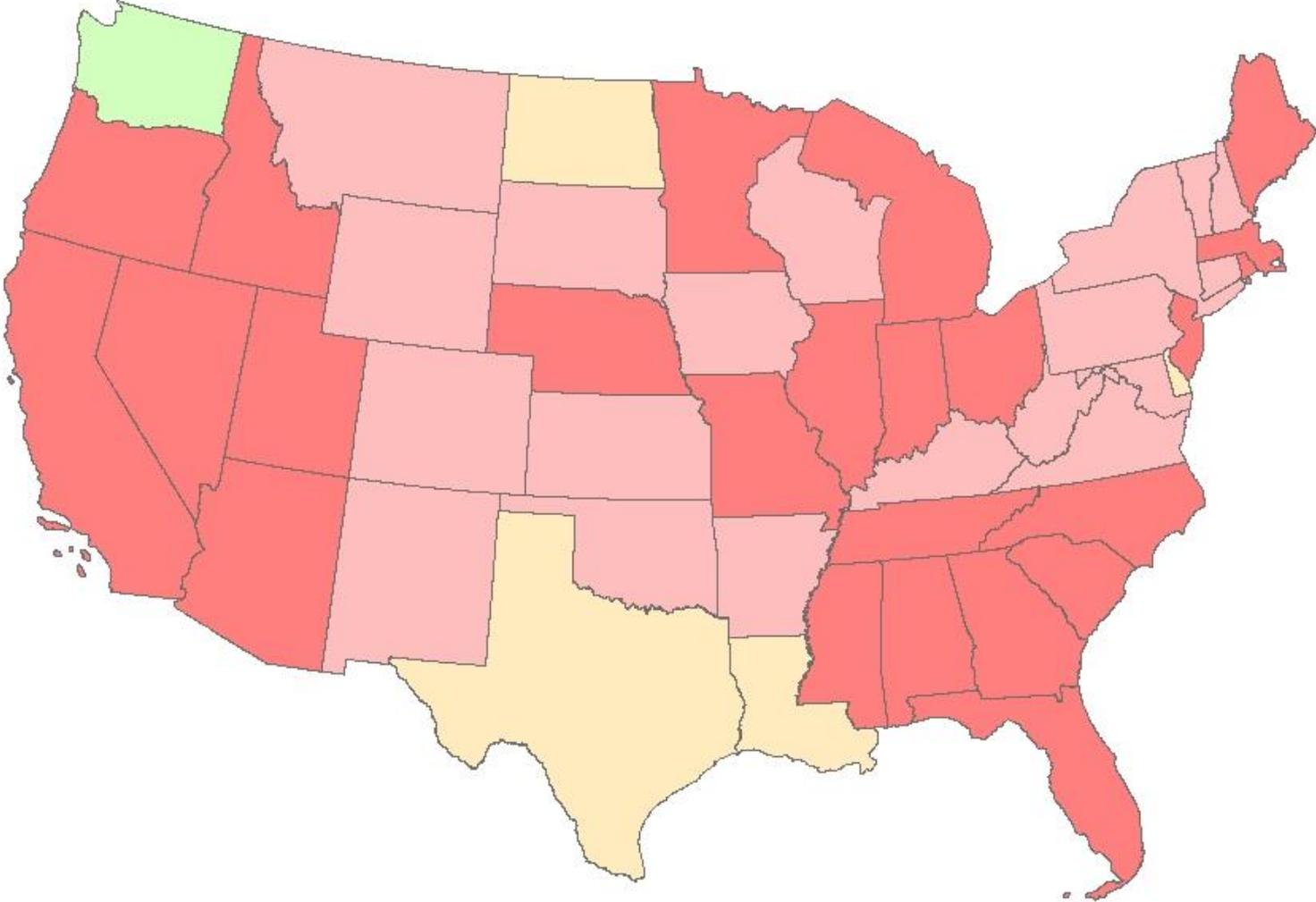
Employment Change (Percent) September 2008



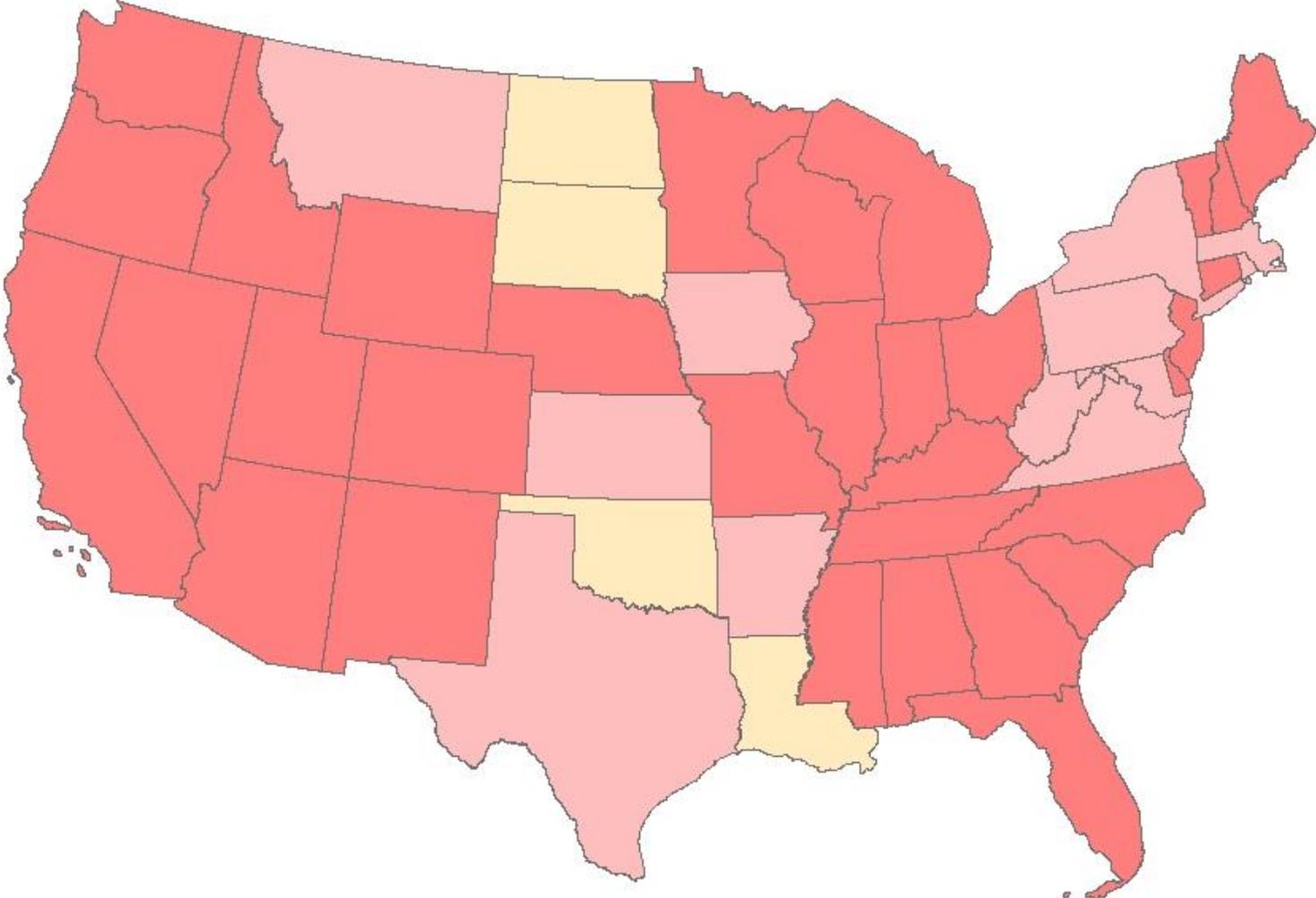
Employment Change (Percent) October 2008



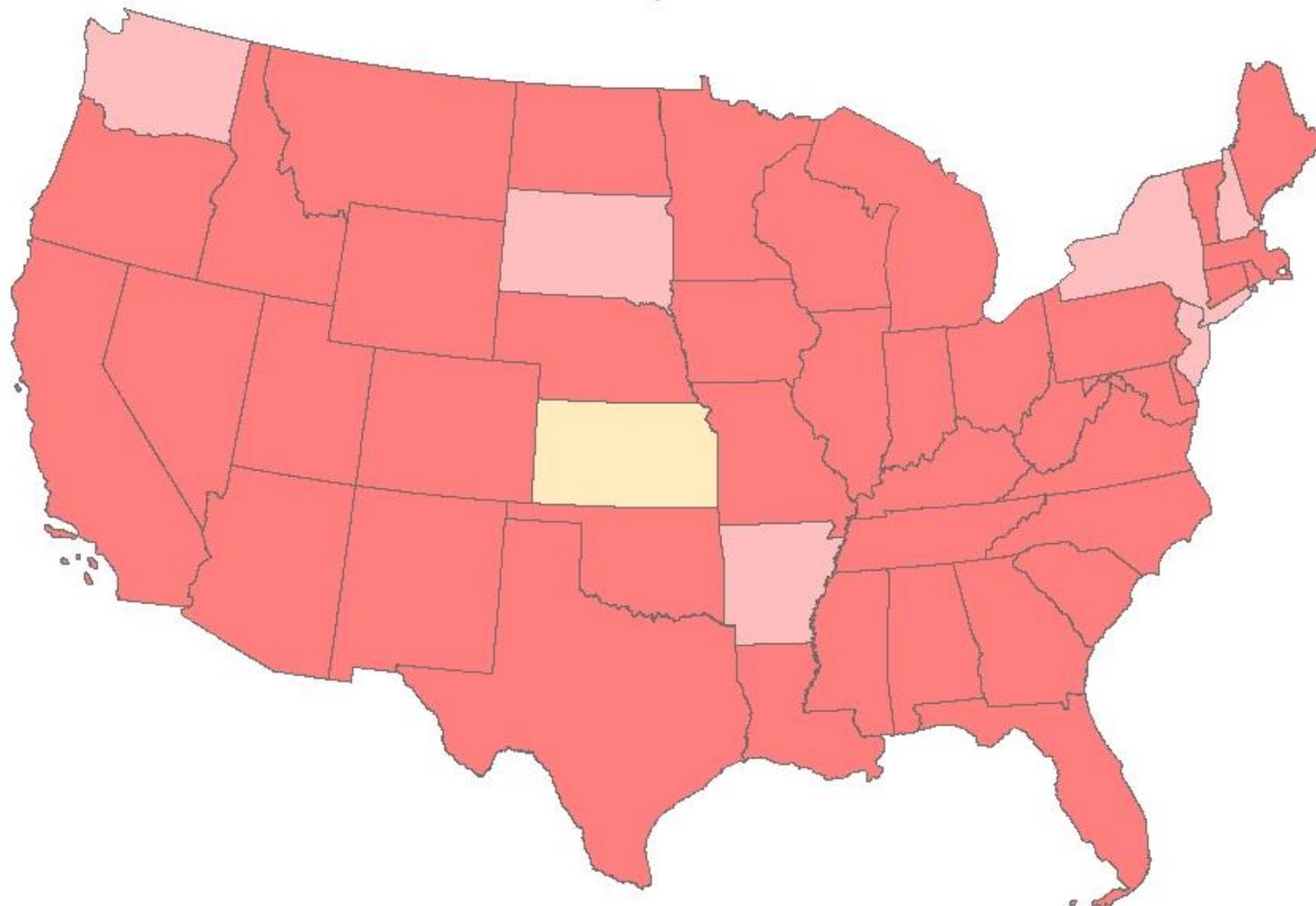
Employment Change (Percent) November 2008



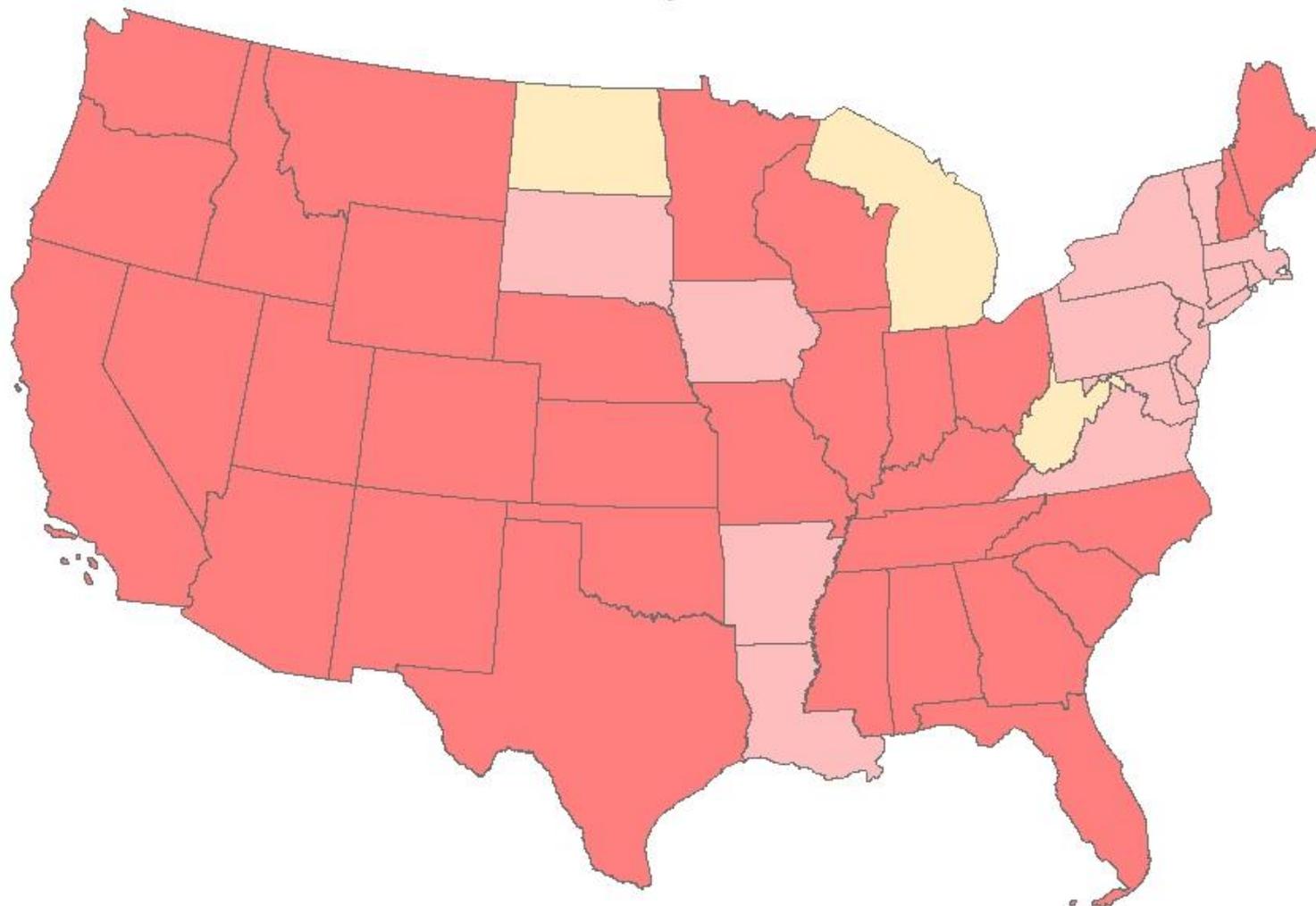
Employment Change (Percent) December 2008



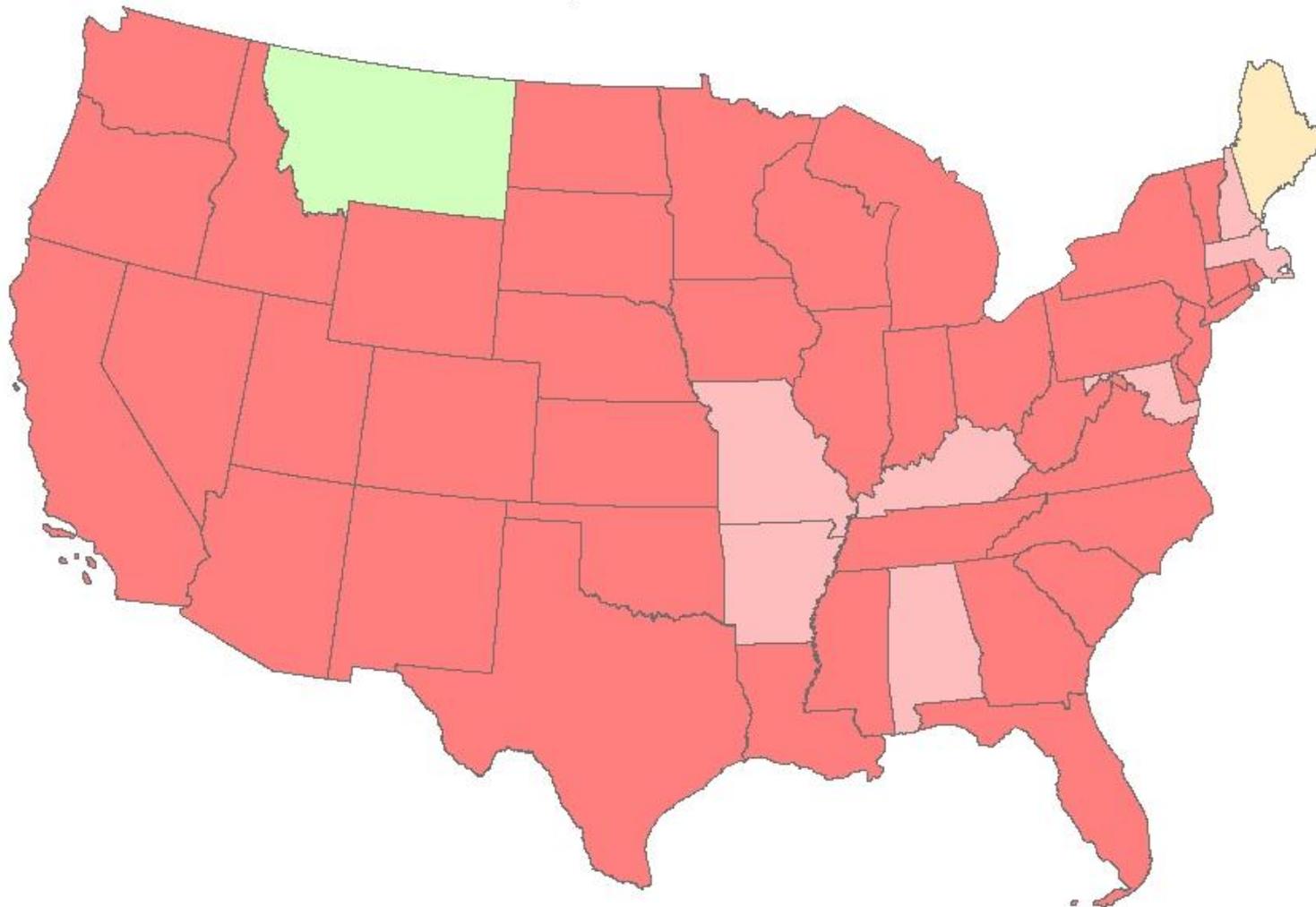
Employment Change (Percent) January 2009



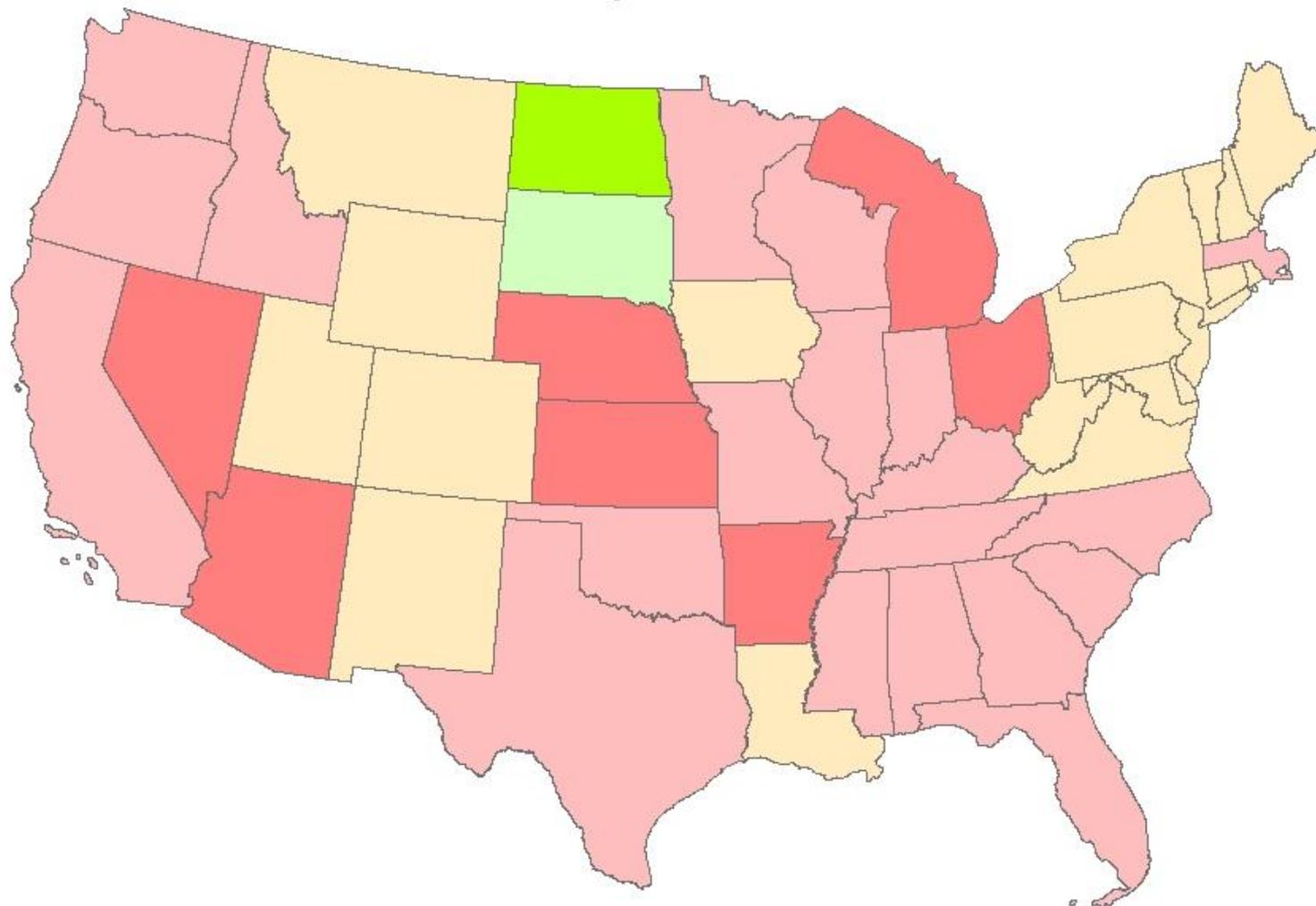
Employment Change (Percent) February 2009



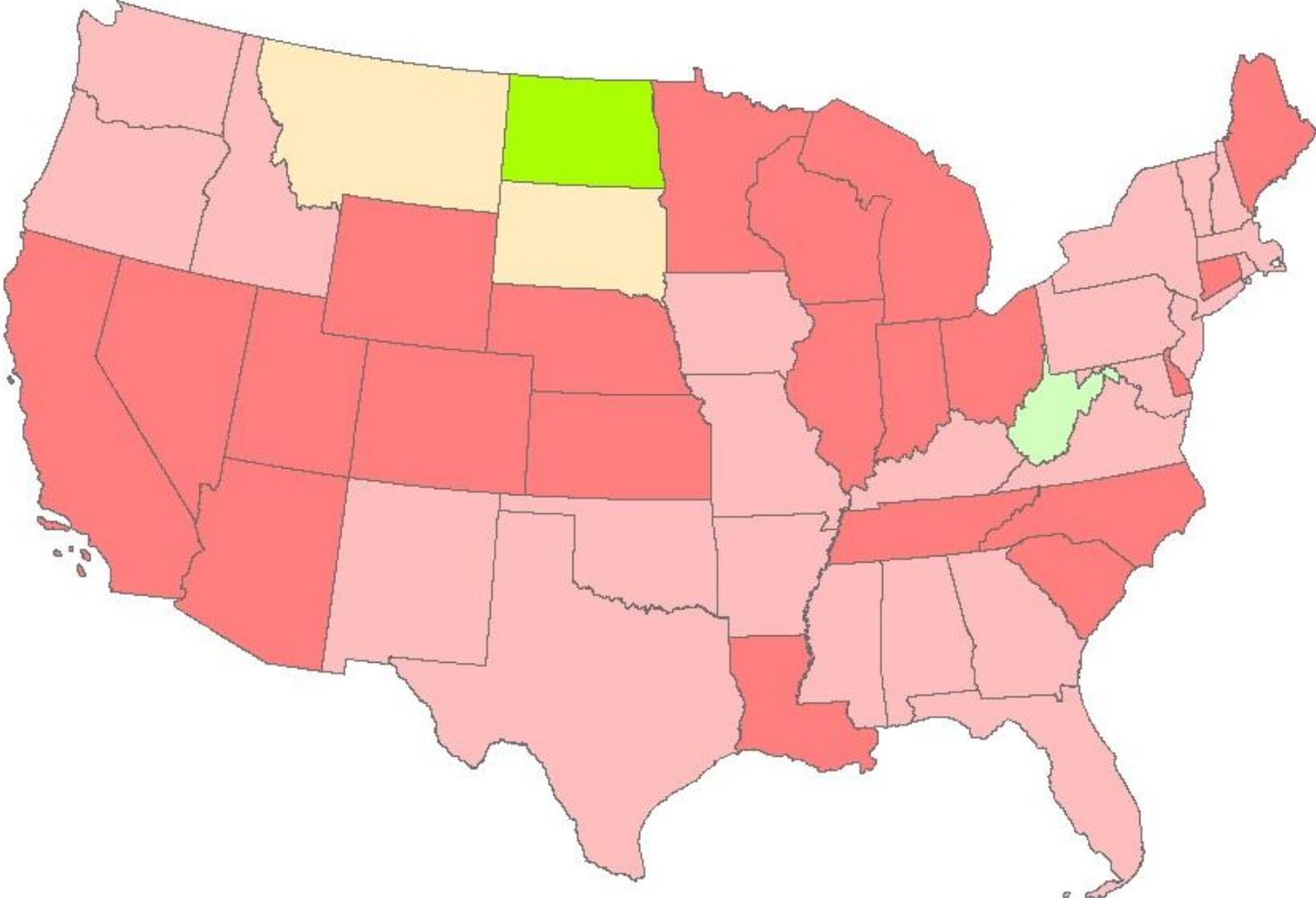
Employment Change (Percent) April 2009



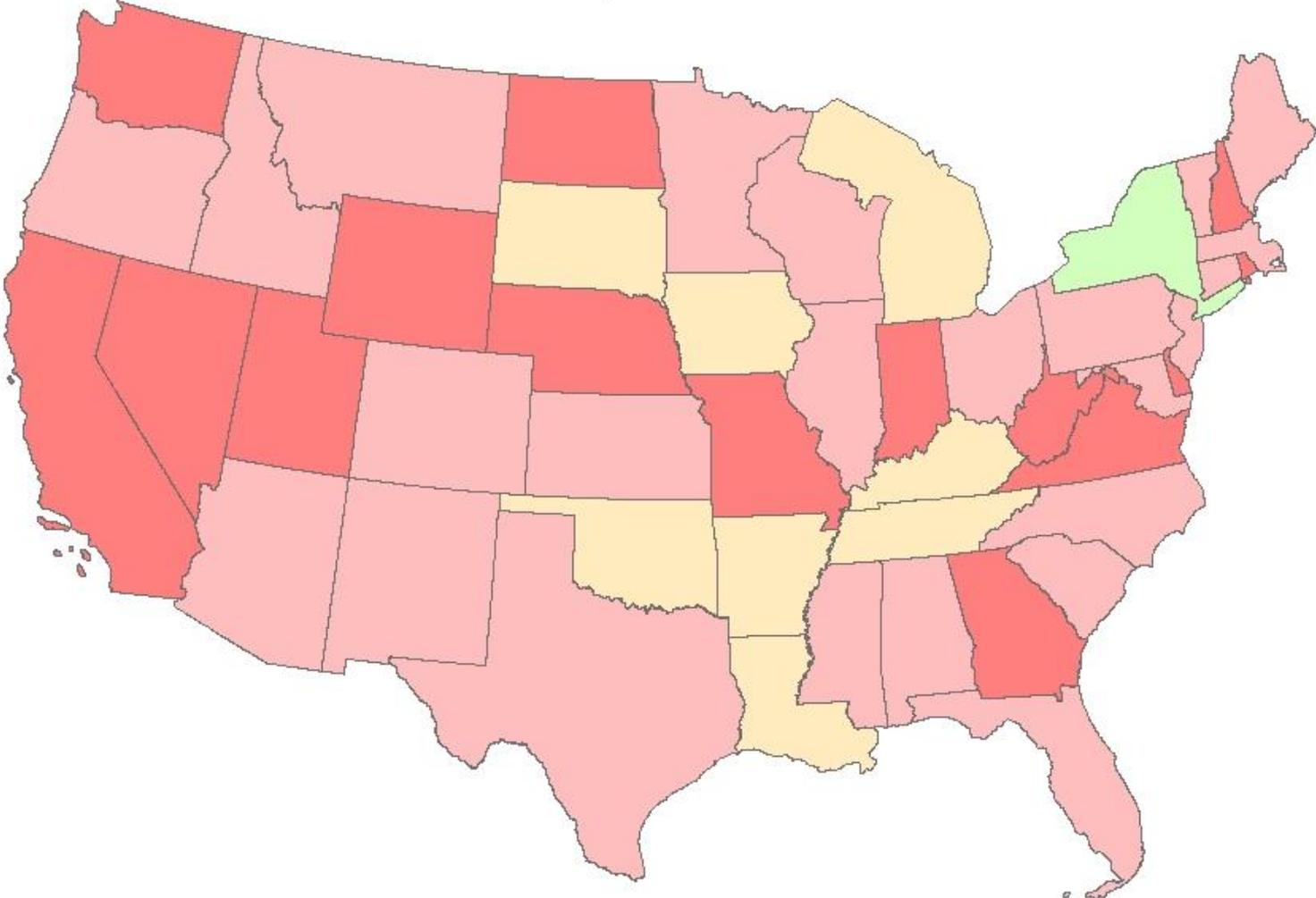
Employment Change (Percent) May 2009



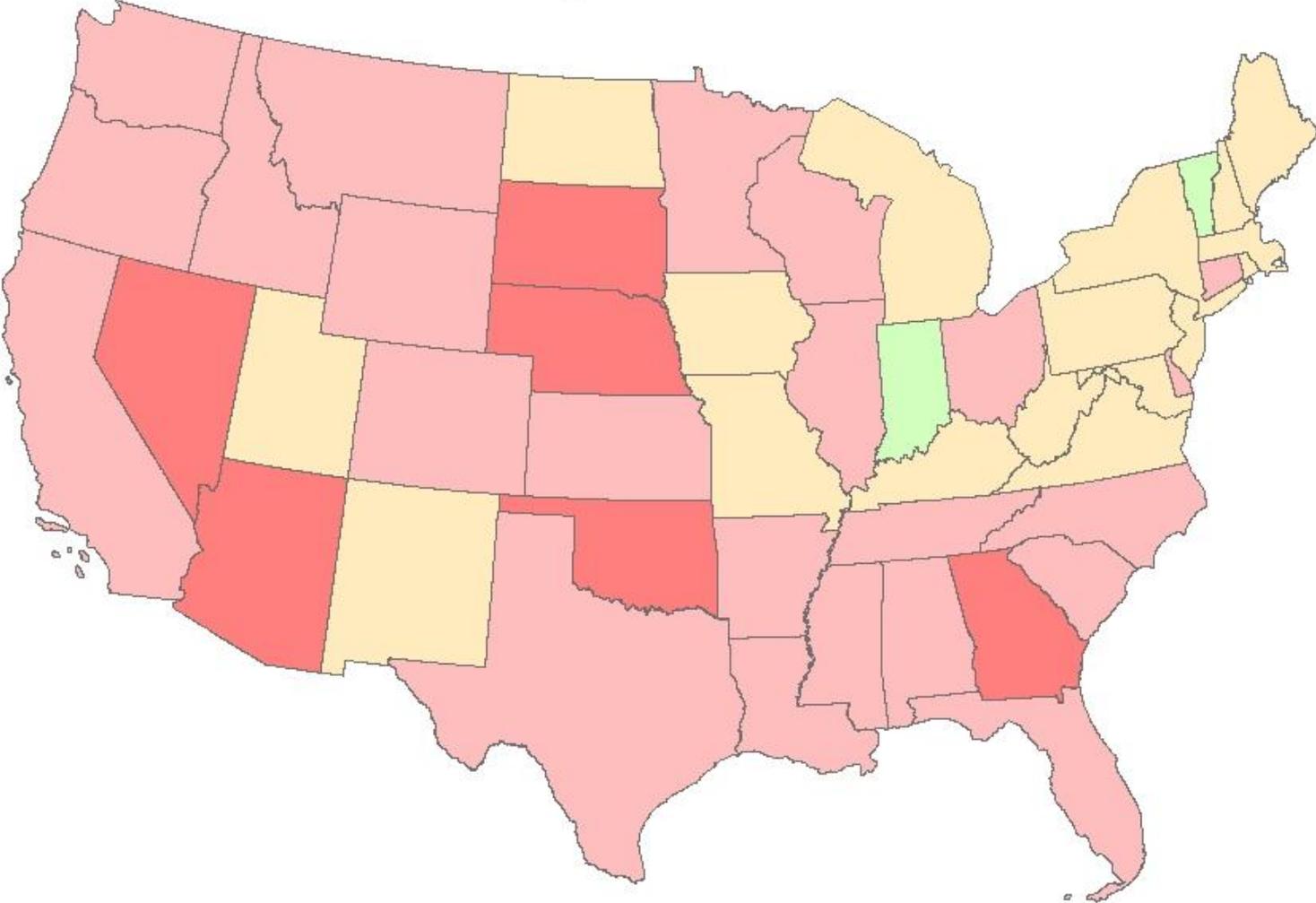
Employment Change (Percent) June 2009



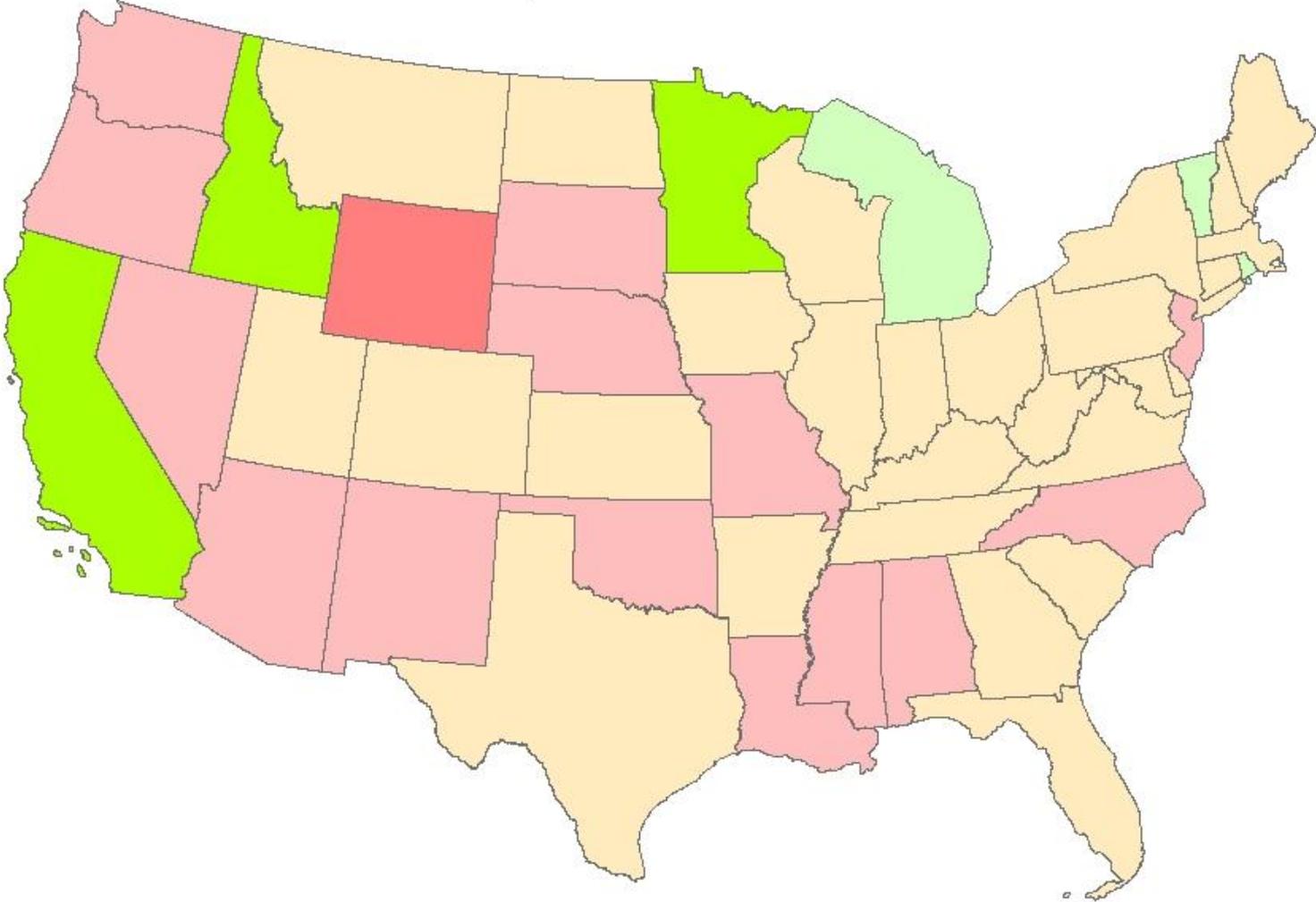
Employment Change (Percent) July 2009



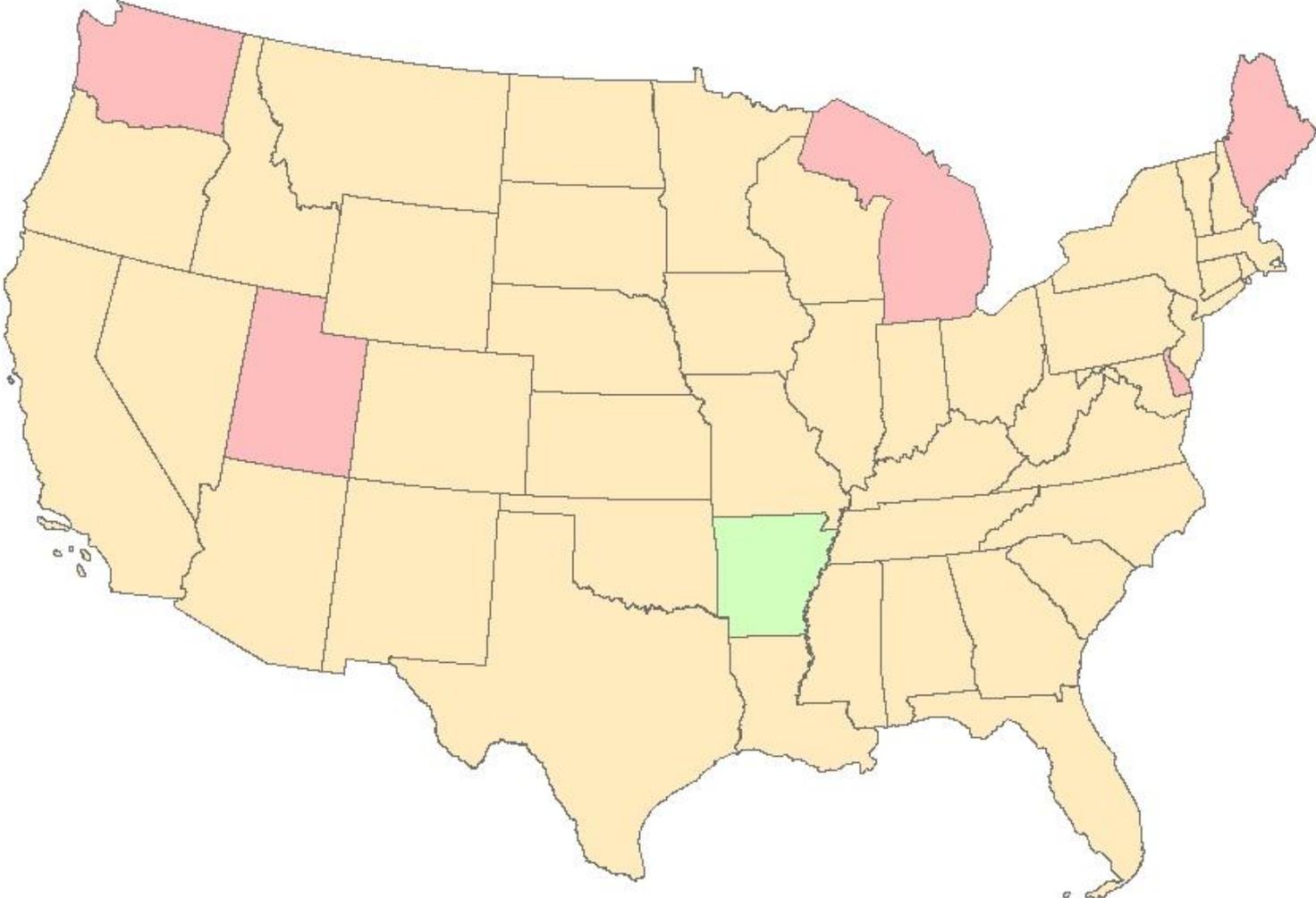
Employment Change (Percent) August 2009



Employment Change (Percent) September 2009



Employment Change (Percent) November 2009



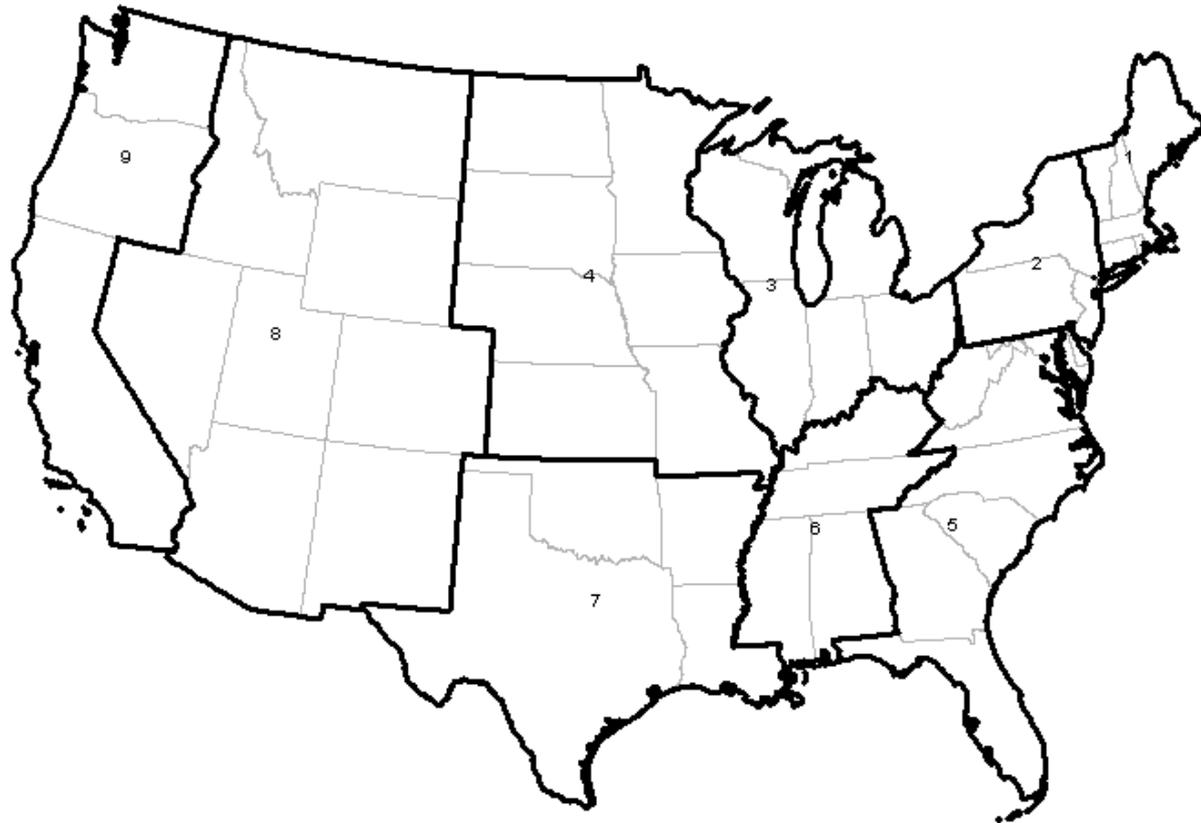
The previous maps capture the dynamics of the month-to-month percentage changes in employment

Several attempts have been made to cluster states into regions using a single map.

The following slides illustrate attempts to describe regions of the US on a single map.

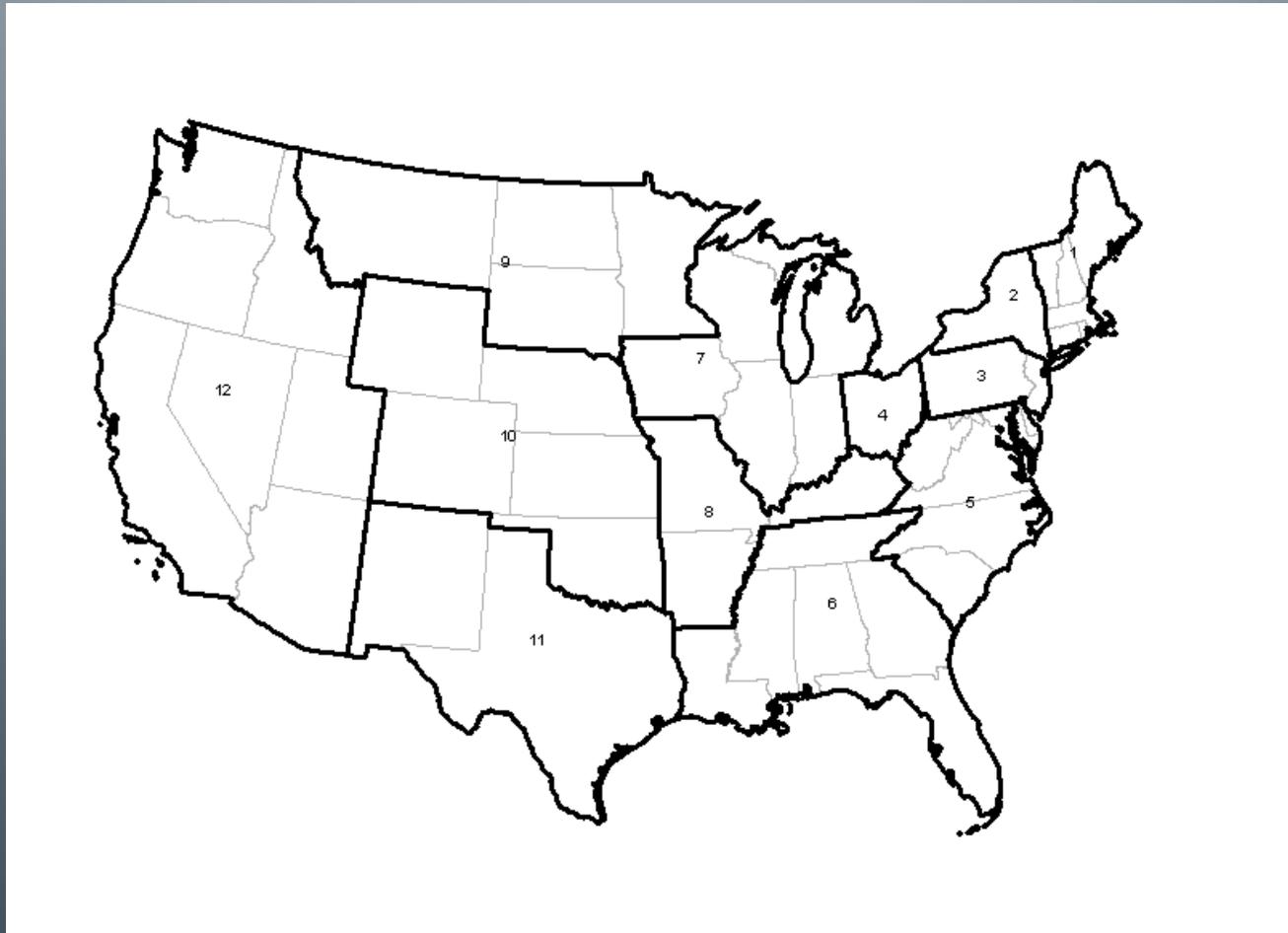
Census Bureau Regions

Created 9 regions in 1880's along state boundaries



Federal Reserve Districts

Created 12 regions in 1913 based on banking relationships
(along county lines grouped here by state)



Bureau of Economic Analysis

Created 8 regions in 1950's based on trends in per capita income in the 1929 to 1950 period



Malezia and Ke

Created 11 regions in 1993 based on economic analysis of metropolitan areas



Crone Regions

Ted Crone (FRB of Philadelphia) in 2005 created 8 regions based on coincident economic indicator of states cycles since the 1970's



Jones

Created 7 economic regions based on Unemployment Rates from 1979 to the 2006 cyclical peaks



Mathematical Method for Creating Regions

- Based on a modified version of Crone's methodology
- Use Excel or similar software
- Create matrix of contiguous states
 - “1” if contiguous
 - “0” if not contiguous
- Insert variables to be mapped
 - In columns by state
- Export as .csv file for statistical software
 - e.g., STATA
 - See example on following slide

“Cluster Analysis” in STATA

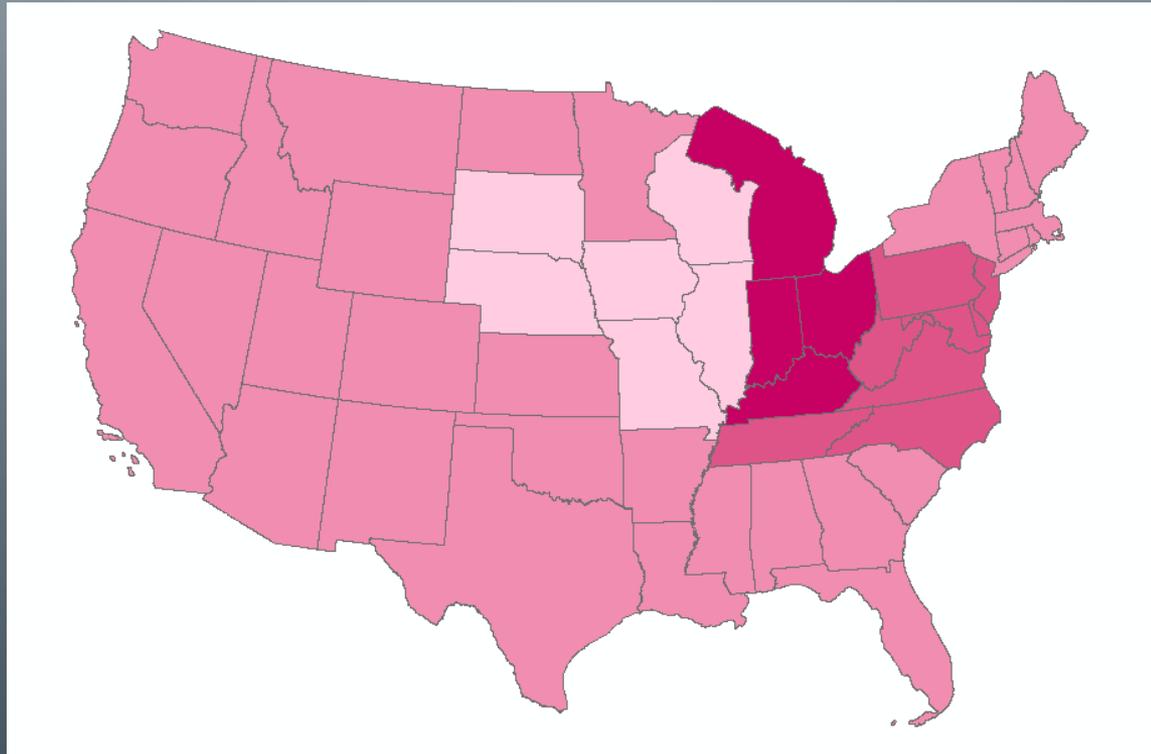
- Same as “Factor Analysis” in some software
- Different from ArcGIS’ “Cluster Analysis”
- Decide on number of regions to create
 - e.g., 4, 5, 6, 7, etc.
- STATA command file to create 4 regions:
 - **insheet using** "D:\States_empl\geog1.csv", comma
 - **cluster kmeans** az ar ca co ct de dc fl ga id il in_ia ks ky la me md ma mi mn ms mo mt ne nv nh nj nm ny nc nd oh ok or pa ri sc sd tn tx ut vt va wa wv wi wy gr0710, **k(4)** name(reg0710)
 - **outsheet using** "D:\States_empl\geog1_reg4.csv", comma
- Creates an output file (.csv) with a optimal regions into which to dissolve the state.

ArcMap

- Join the STATA-created .csv file to a shape file of the states
- Dissolve the states into the region numbers found using STATA
- Map the resulting regions

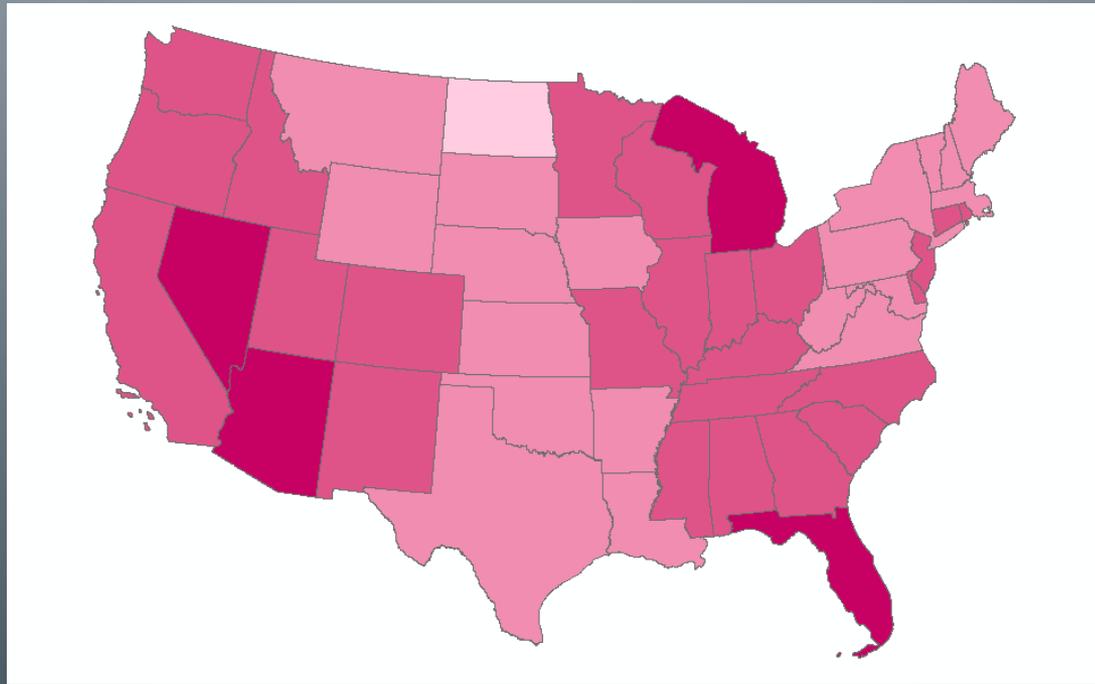
Great Recession Employment Changes Using Statistical Software

The regional map of the 2007 to 2010 recession based on statistical software explicitly **takes into account** the first law of geography



Great Recession Employment Changes Using Natural Breaks

The regional map of the 2007-2010 recession
using only GIS
ignores the first law of geography.



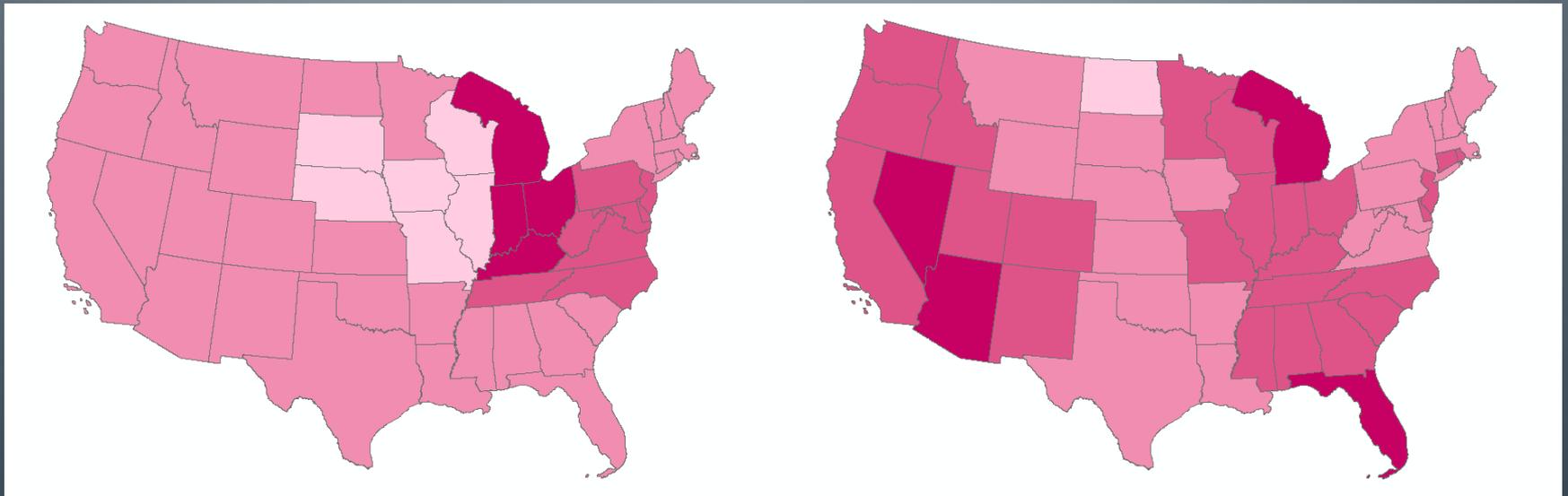
Conclusions

- Creating economic regions from state-level data results in **different regional clusters** depending on the time span or time period and the economic variables being considered
- Using purely **GIS classifications ignore** the first rule of geography by ignoring nearness
- Using **statistical software** including variables for nearness **incorporates** the first law of geography
- Future research
 - Including month-to-month data over many time periods using statistical software **may** enable a single map to capture the regional nature of the dynamics of economic change

The Great Recession

Employment Change 2007 to 2010

Two geographic views of the recession's impact



Thank you