

Economic Cycles and GIS

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Common Uses of GIS in Economics

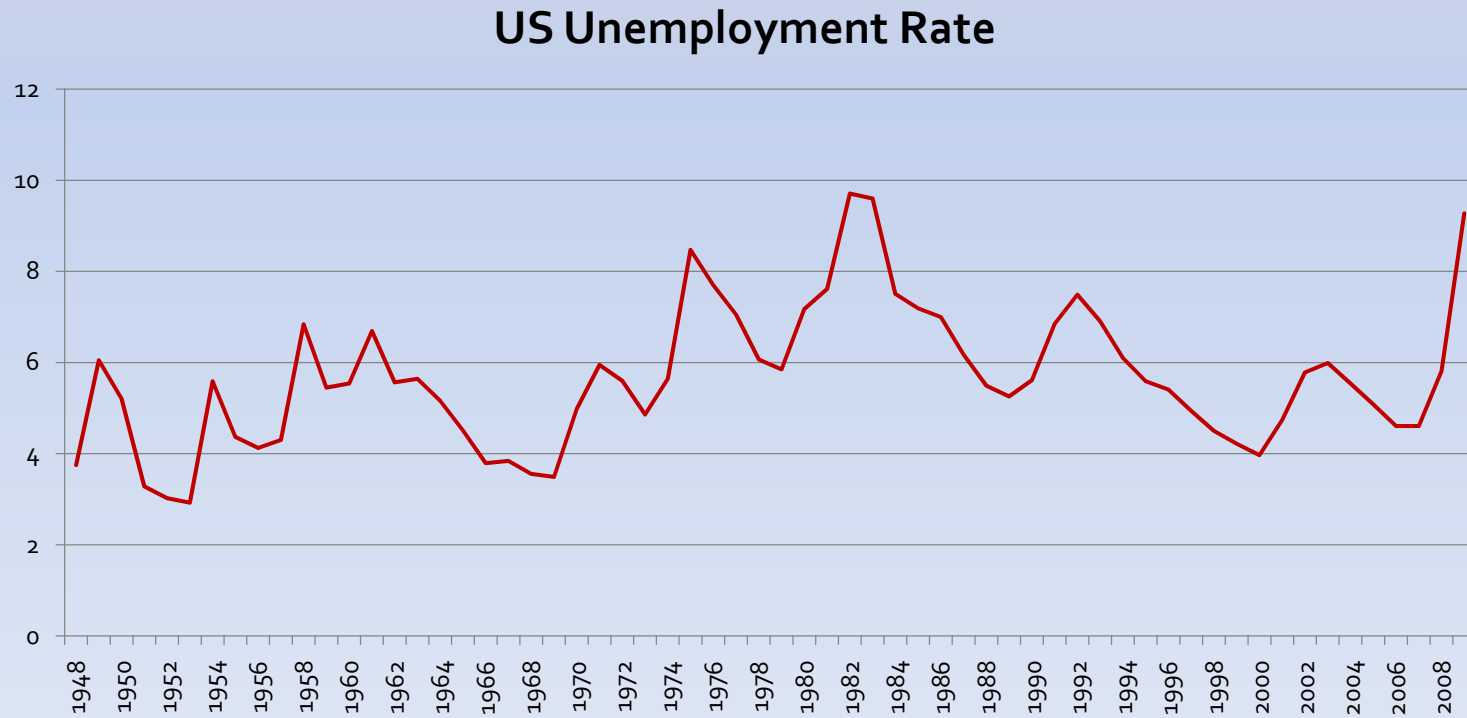
- Natural Resource Economics
 - Agricultural Economics
 - Environmental Economics
 - Mapping Census Data
 - Mapping International Data
 - Mapping Housing Characteristics
-
- GIS Can Also Be Used to Analyze Unemployment Rate Data

About Unemployment Rates

- Percentage of the Labor Force that is employed or actively seeking employment
- Only the proportion “actively seeking” are counted as unemployed
- The unemployment rate is the number actively seeking divided by the labor force
- The unemployment rate and its changes are one measure of economic activity
- The unemployment rate commonly changes a few months after changes in production

National Unemployment Rates

- Variation over time nationally ranges annually between roughly 4% and 10%

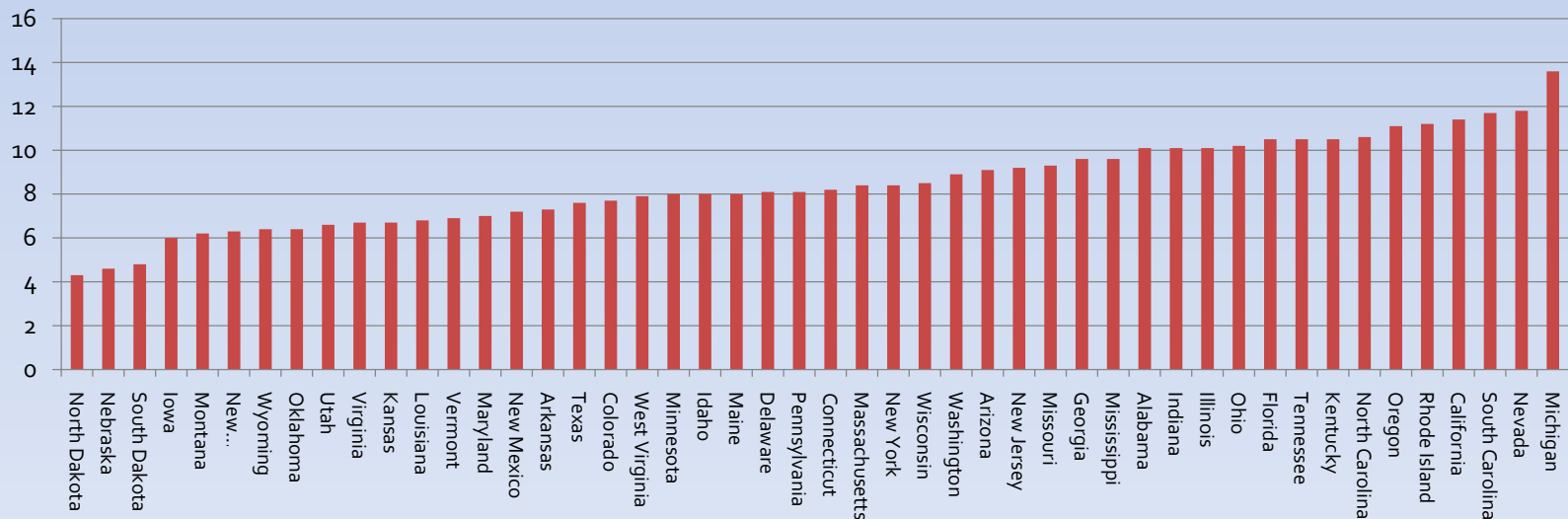


National or Regional?

- Are national average unemployment rates meaningful?
- Would the national average temperature be meaningful information?
- Both temperature and unemployment vary widely by geographic location
- Variation by geography for both is at least as interesting as is the variation over time
 - and perhaps more so

Average Unemployment Rates by State in 2009

- States' annual unemployment rates varied from 4% to 14% in 2009
- A wider range than national unemployment rates over time

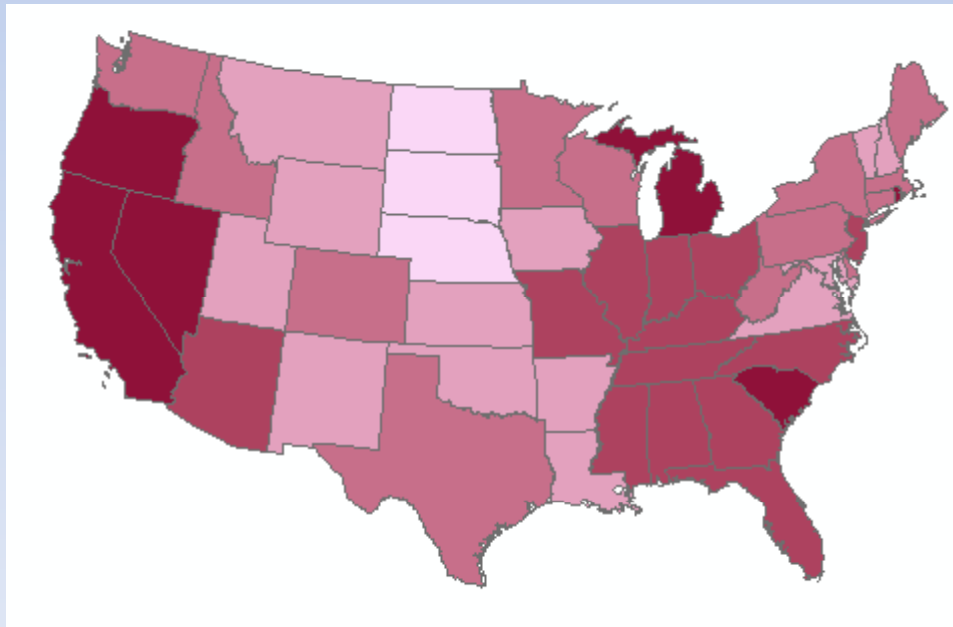


Unemployment Rates are Regional

- In 2009, all states were higher than their historic averages
- The 2009 rates are clearly regional
 - Relatively high on the west coast
 - Generally lower in the plains states
 - Higher in the midwest and southeast
 - In a middle range in the northeast
- GIS reveals the geographic pattern of unemployment at a given point in time

Unemployment Rates 2009

- State unemployment rates varied from 4.3% to 13.6% by state in 2009
- Rates are NOT geographically random
 - Can test for randomness using Moran's I

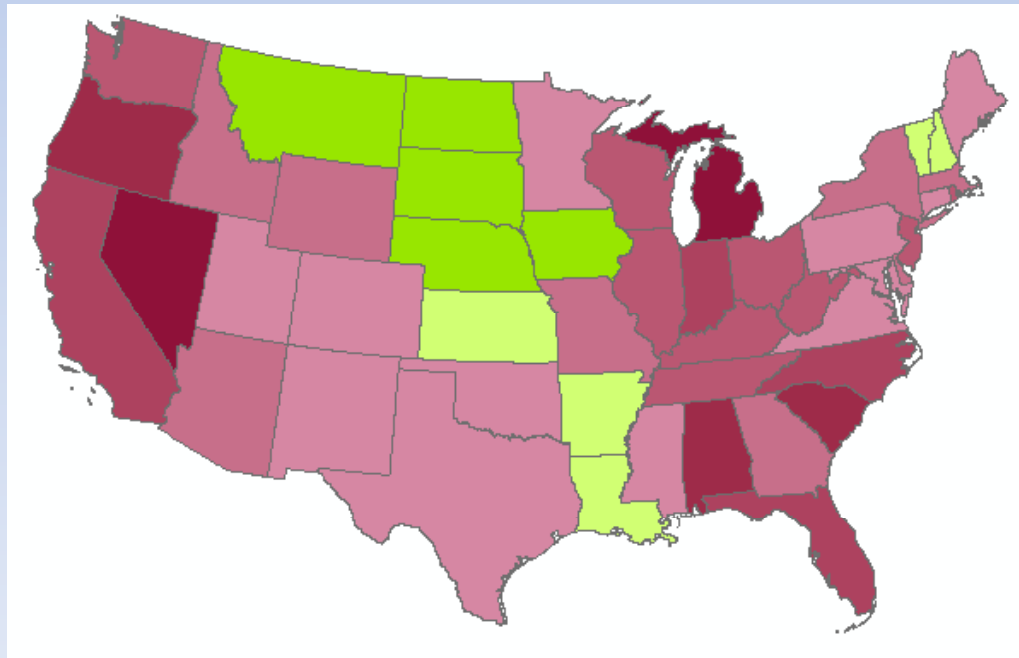


Changes in Unemployment Rates

- “The” national unemployment rate
 - Decreased from 2003 to 2006
 - Remained steady in 2007
 - Increased in 2008 and 2009
 - By 1.2 and 3.5 percentage points, respectively
- However, all states do not change in lock step
- Mapping unemployment rate changes by state reveals the nature of the recent recession

Unemployment Recovery Begins in 2009

- In 2009, some states began their recovery (green) while other states continued to decline (red) with increasing unemployment

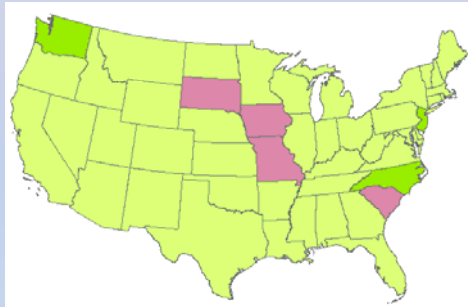


Different Ways to Analyze

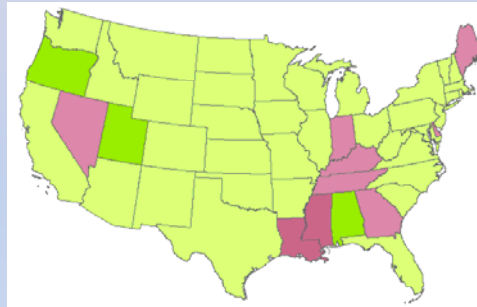
- Three different methods of Analysis are illustrated on the following slides:

Unemployment Rate Changes 2004 through 2009

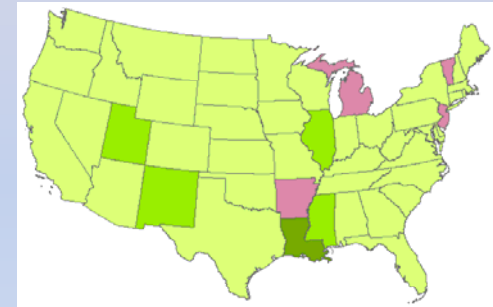
2004



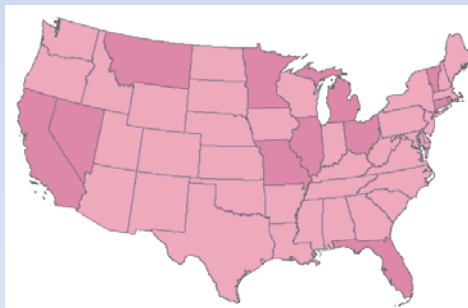
2005



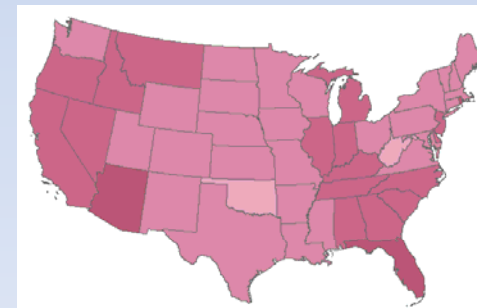
2006



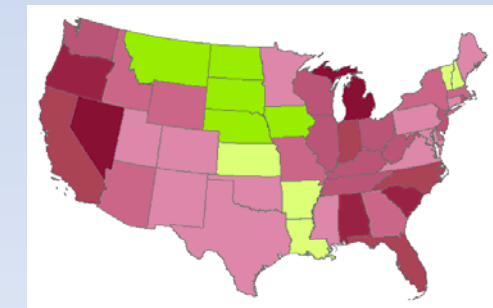
2007



2008

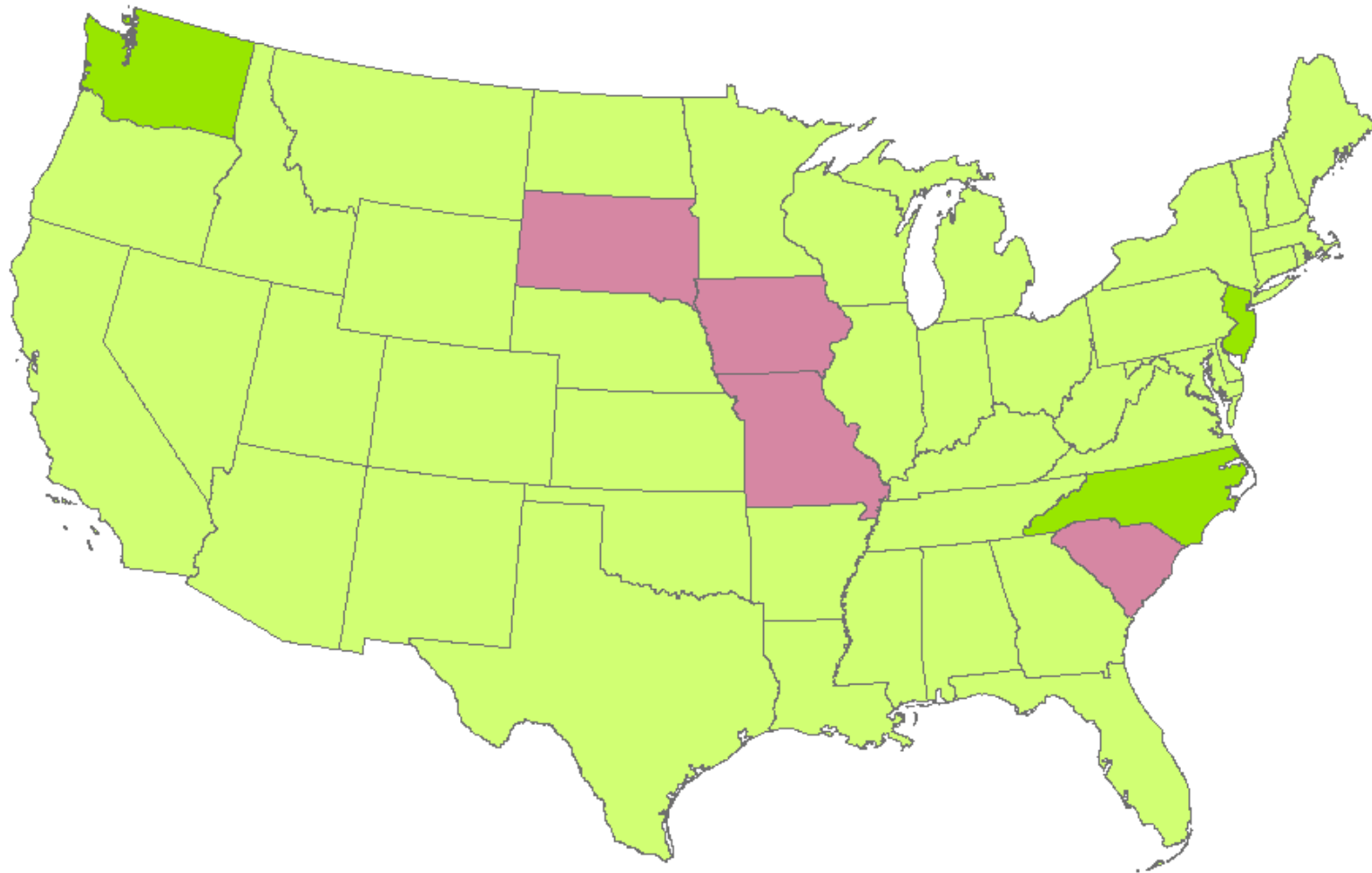


2009

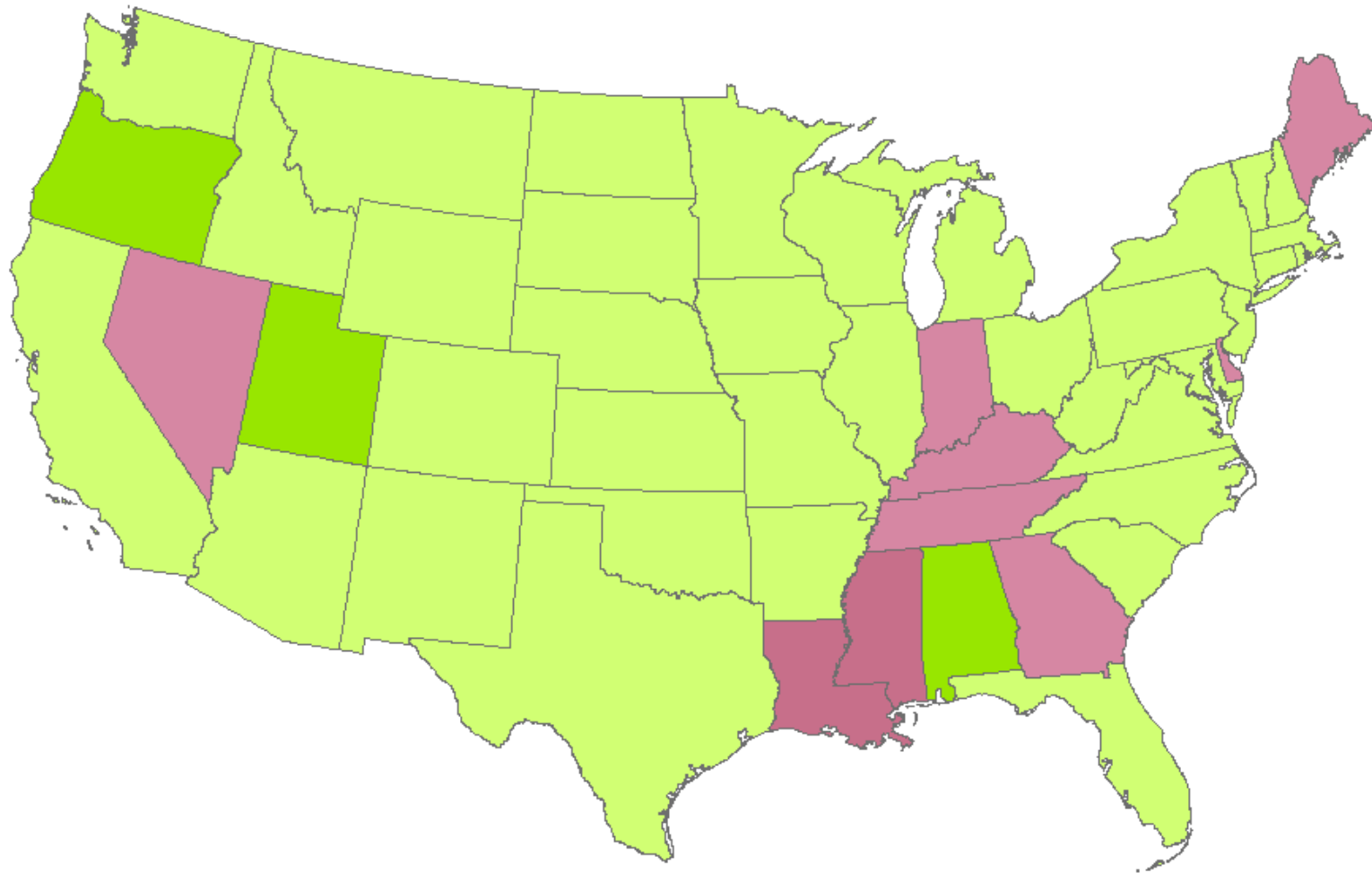


Year-by-Year Analysis Follows

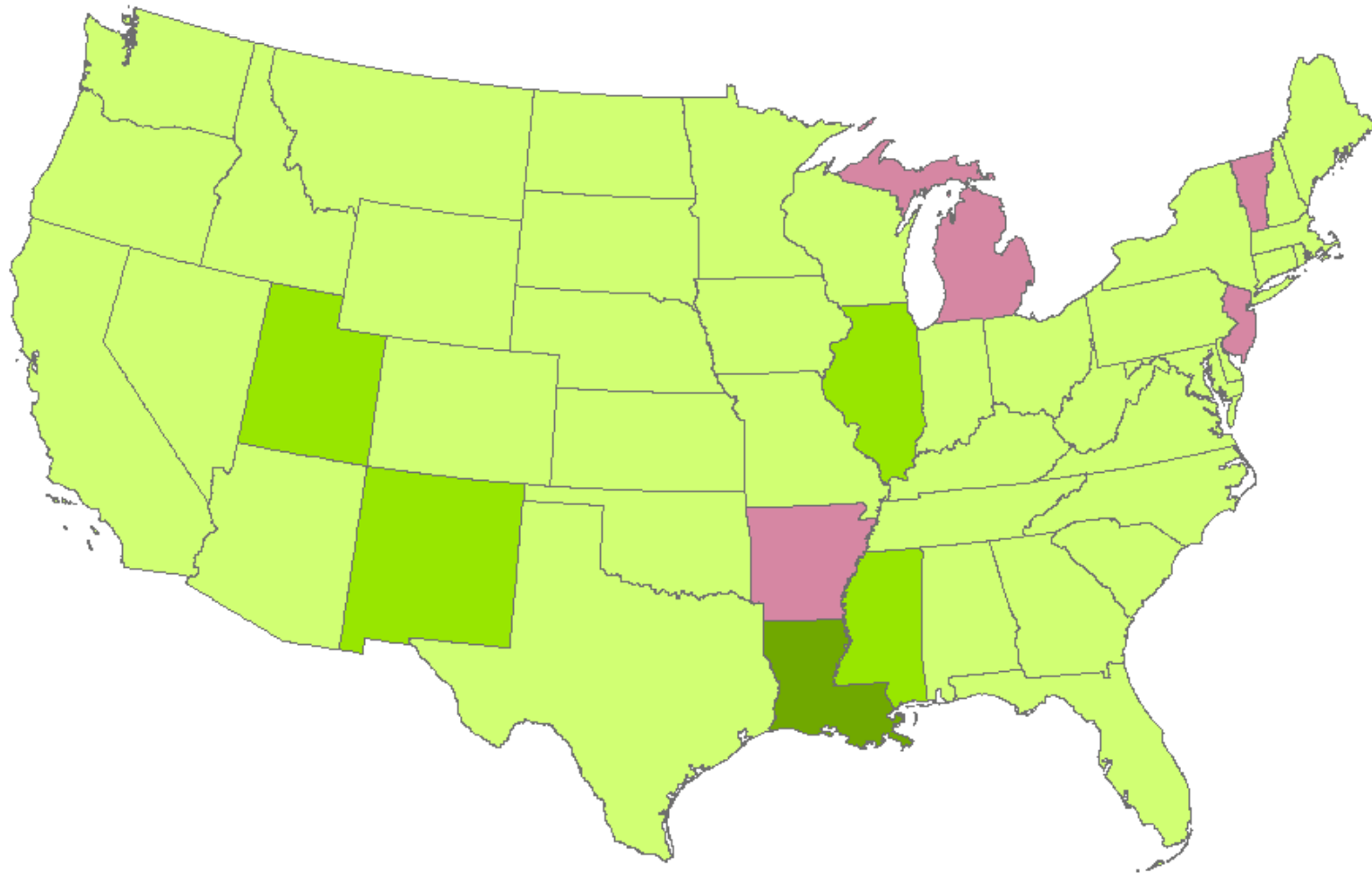
Changes in Unemployment Rate 2003 to 2004



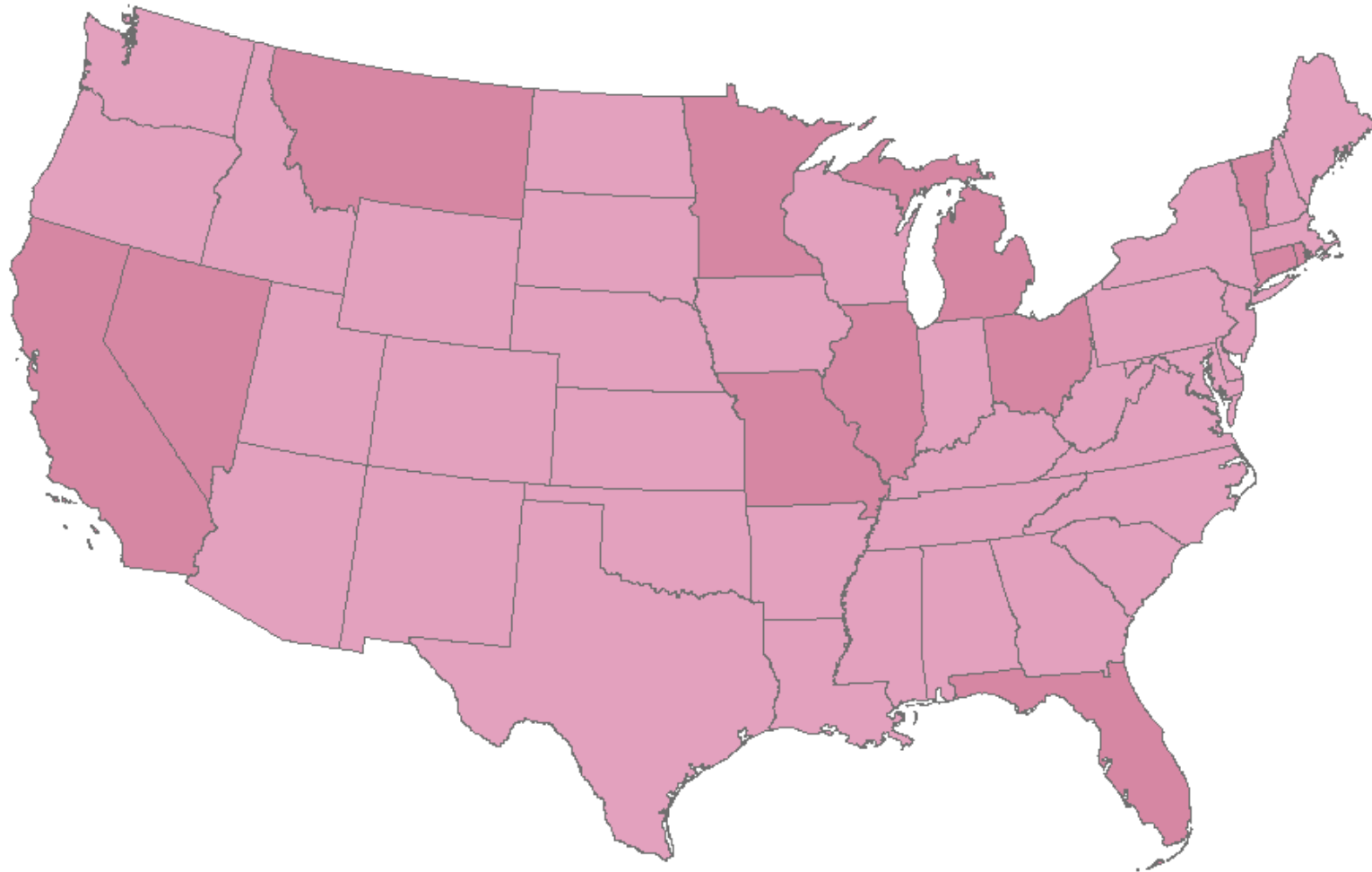
Changes in Unemployment Rate 2004 to 2005



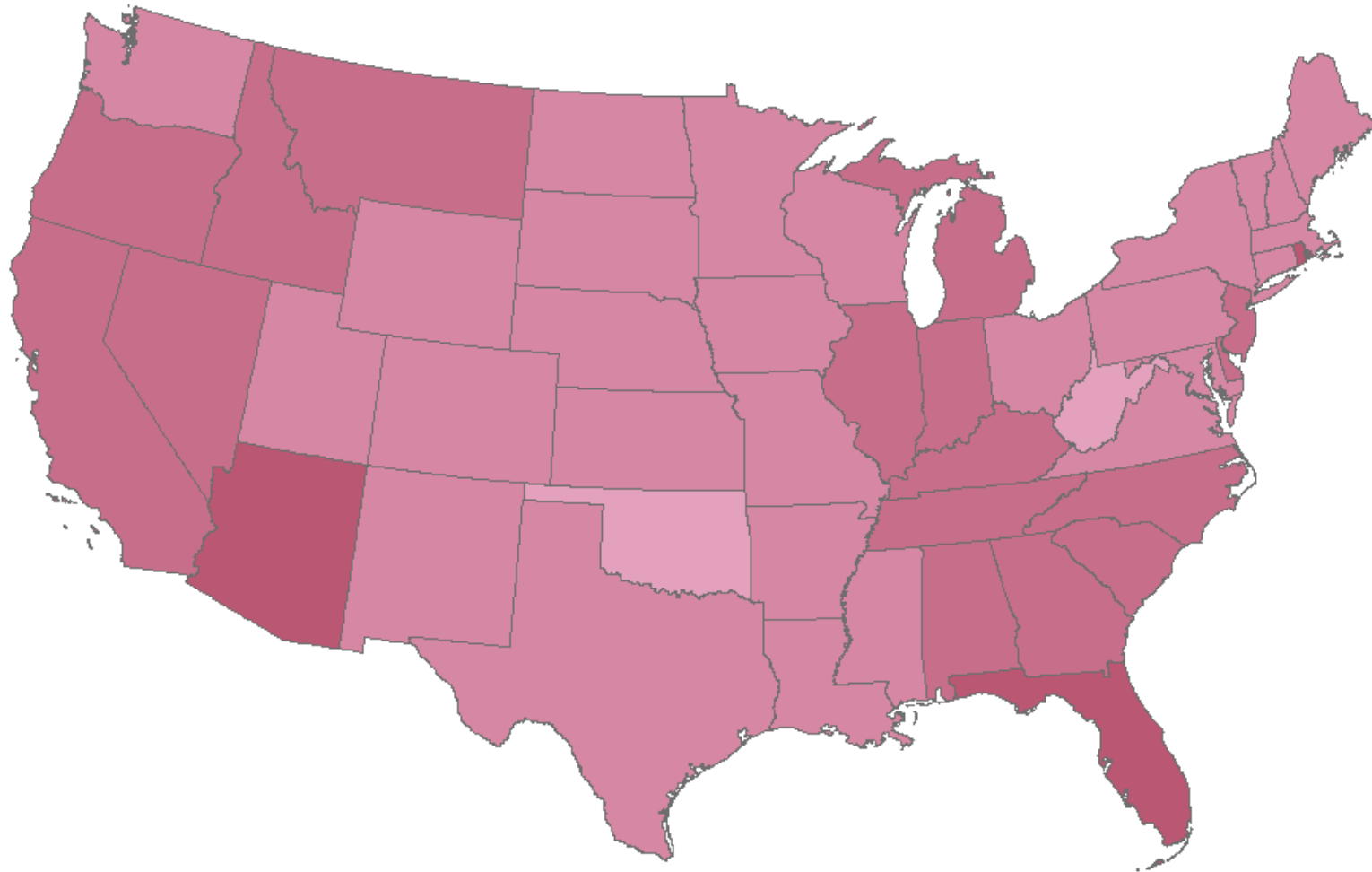
Changes in Unemployment Rate 2005 to 2006



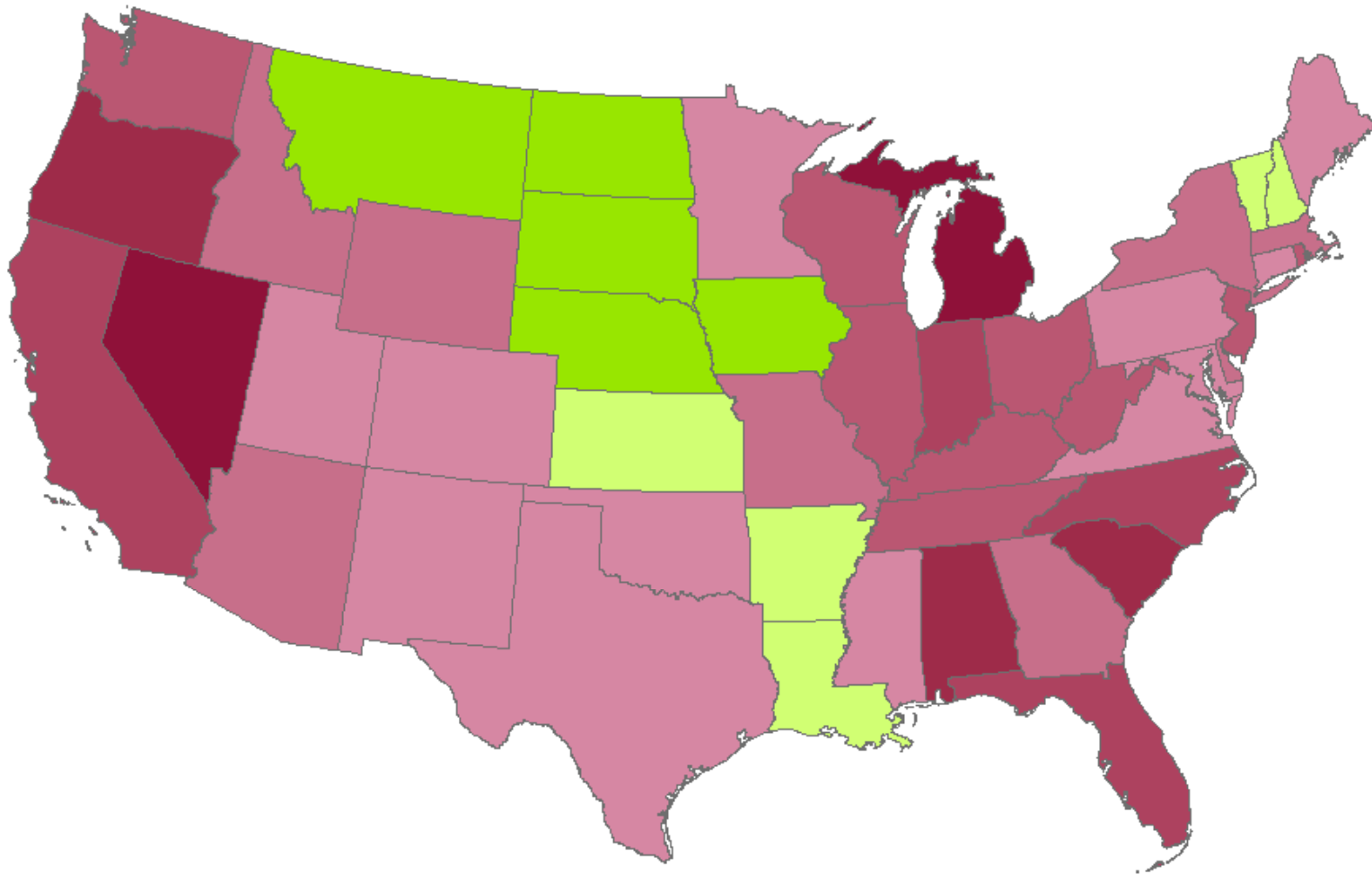
Changes in Unemployment Rate 2006 to 2007



Changes in Unemployment Rate 2007 to 2008

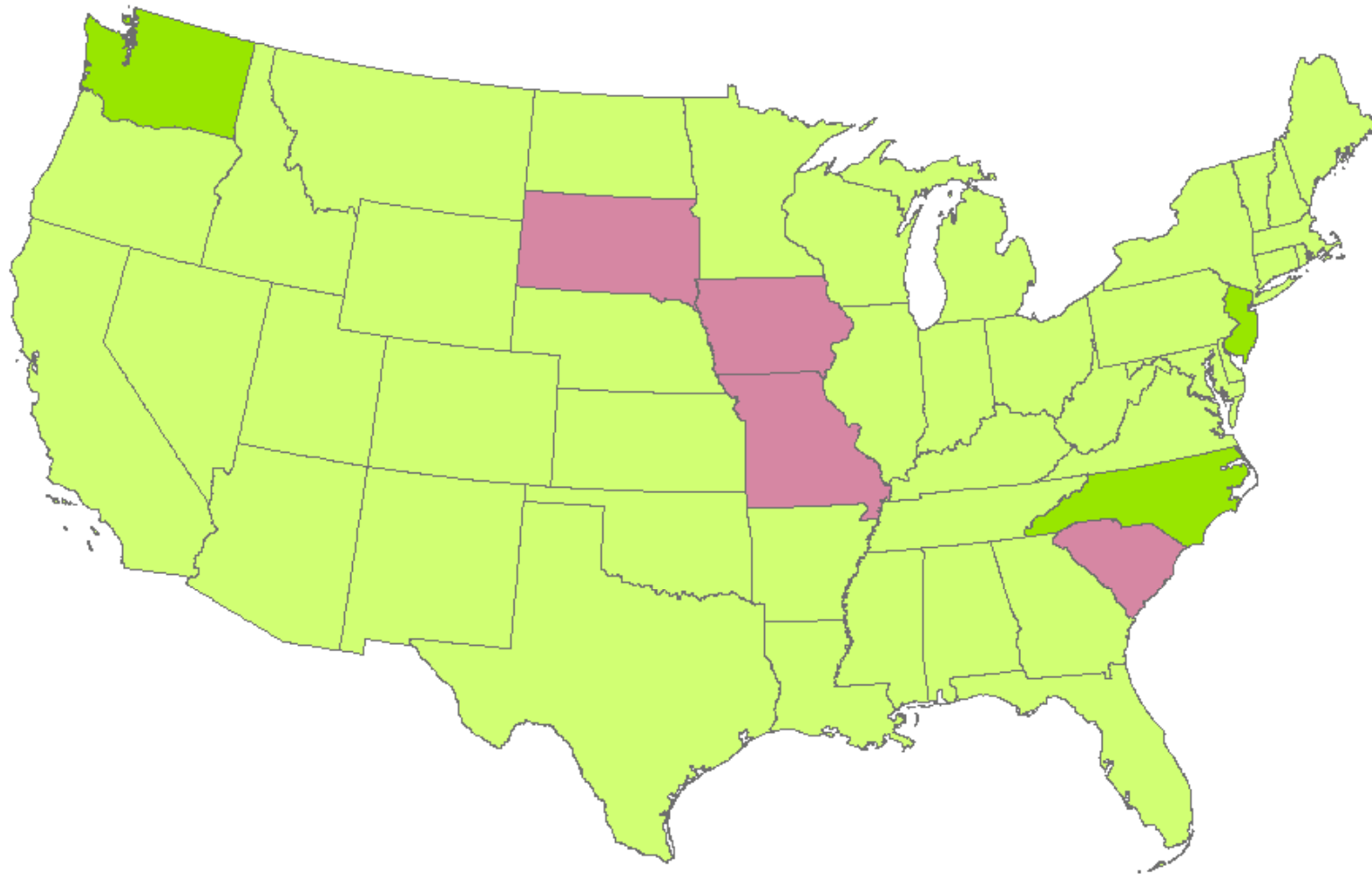


Changes in Unemployment Rate 2008 to 2009



Animation Follows . . .

Changes in Unemployment Rate
2003 to 2004



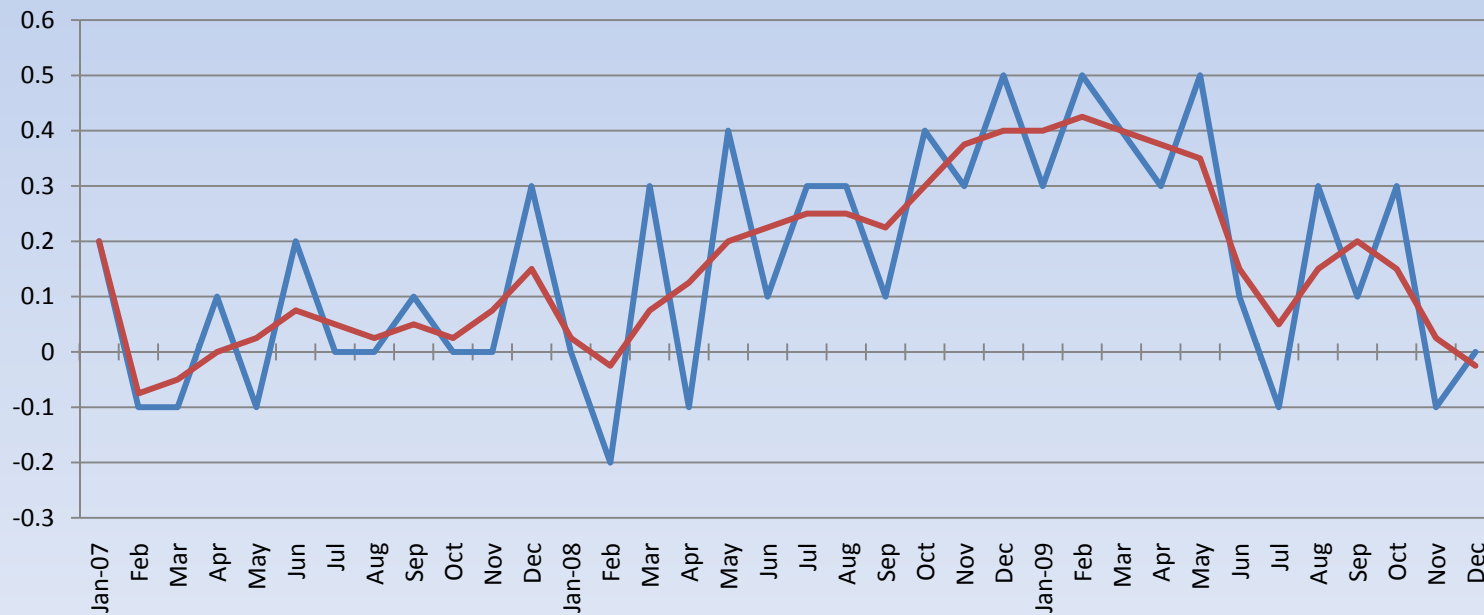
Lessons Learned by Applying GIS to Economics

- Enables observation of the spatial distribution of unemployment
- Not all states are in the same stage of an economic cycle at the same time
- Enables analysis:
 - Do the same states lead others into or out of an economic recession?
 - Can some regions of the country be in recession while others are not?

Mapping Monthly Changes in Unemployment Rates by States

Temporal Phases of the Recession

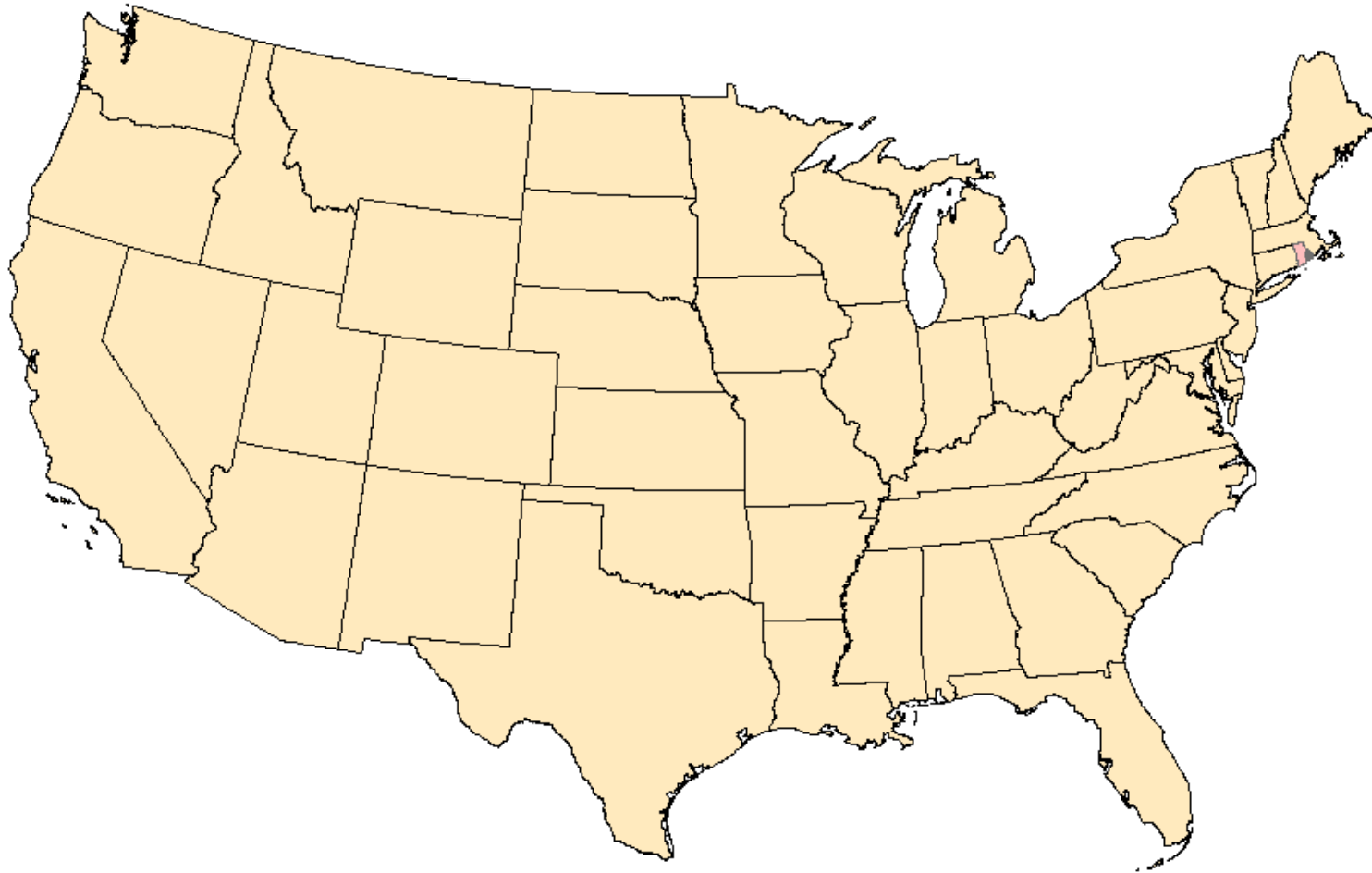
- Accelerated from March to June 2008
- Again from October 2008 to February 2009
- Again in August and September 2009



The National Time Series Can Be Misleading

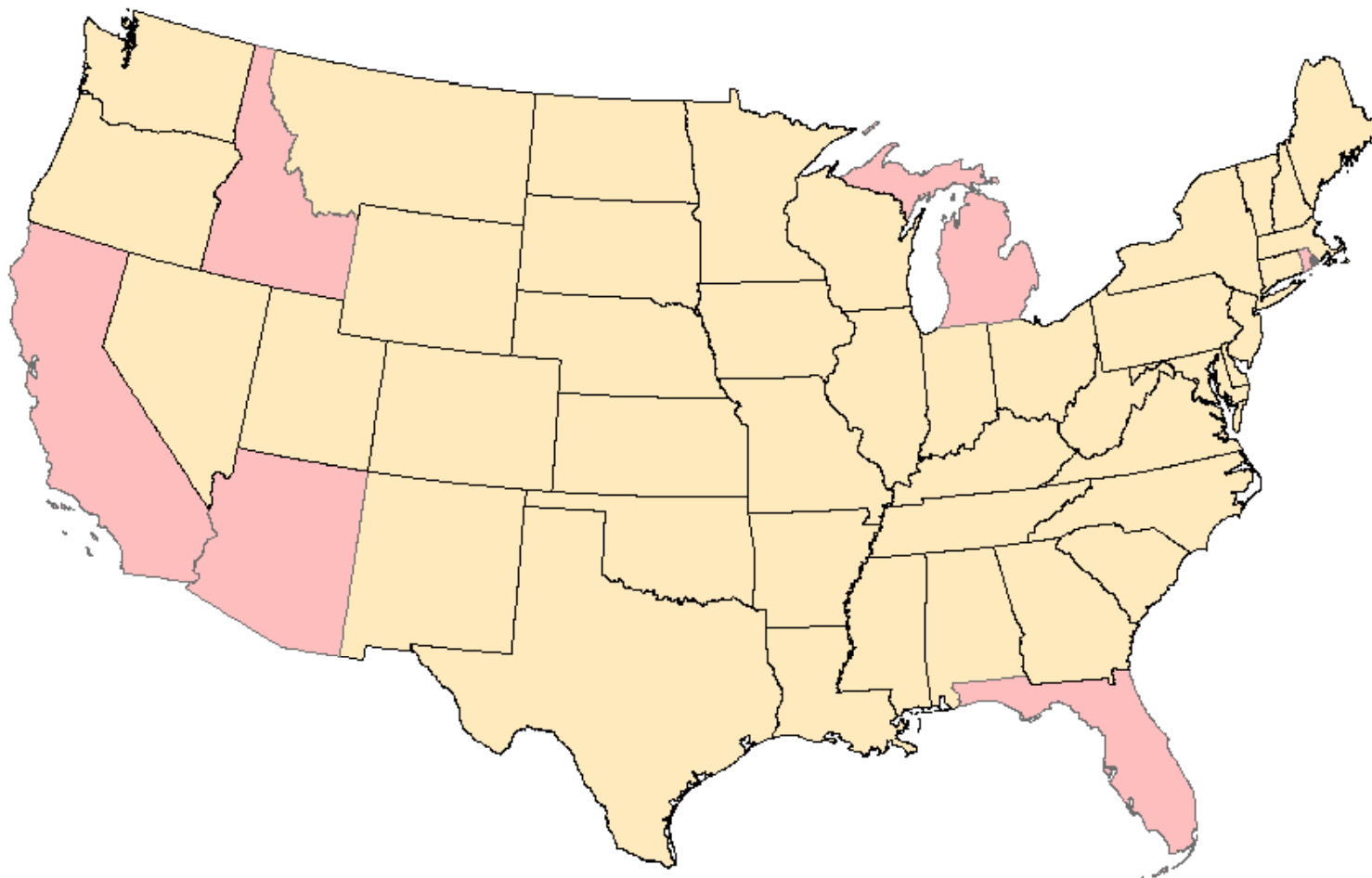
- Monthly spatial analysis tells a different story
- The following slides illustrate the geographic, as well as the temporal, aspects of the recent recession
- This analysis reveals the geographic ebbs and flows which underlay the national recession
- The recession had its geographic origins in three different parts of the US
 - Then spread to nearby states
 - Until all states were involved

Changes in Unemployment Rates by State March 2008

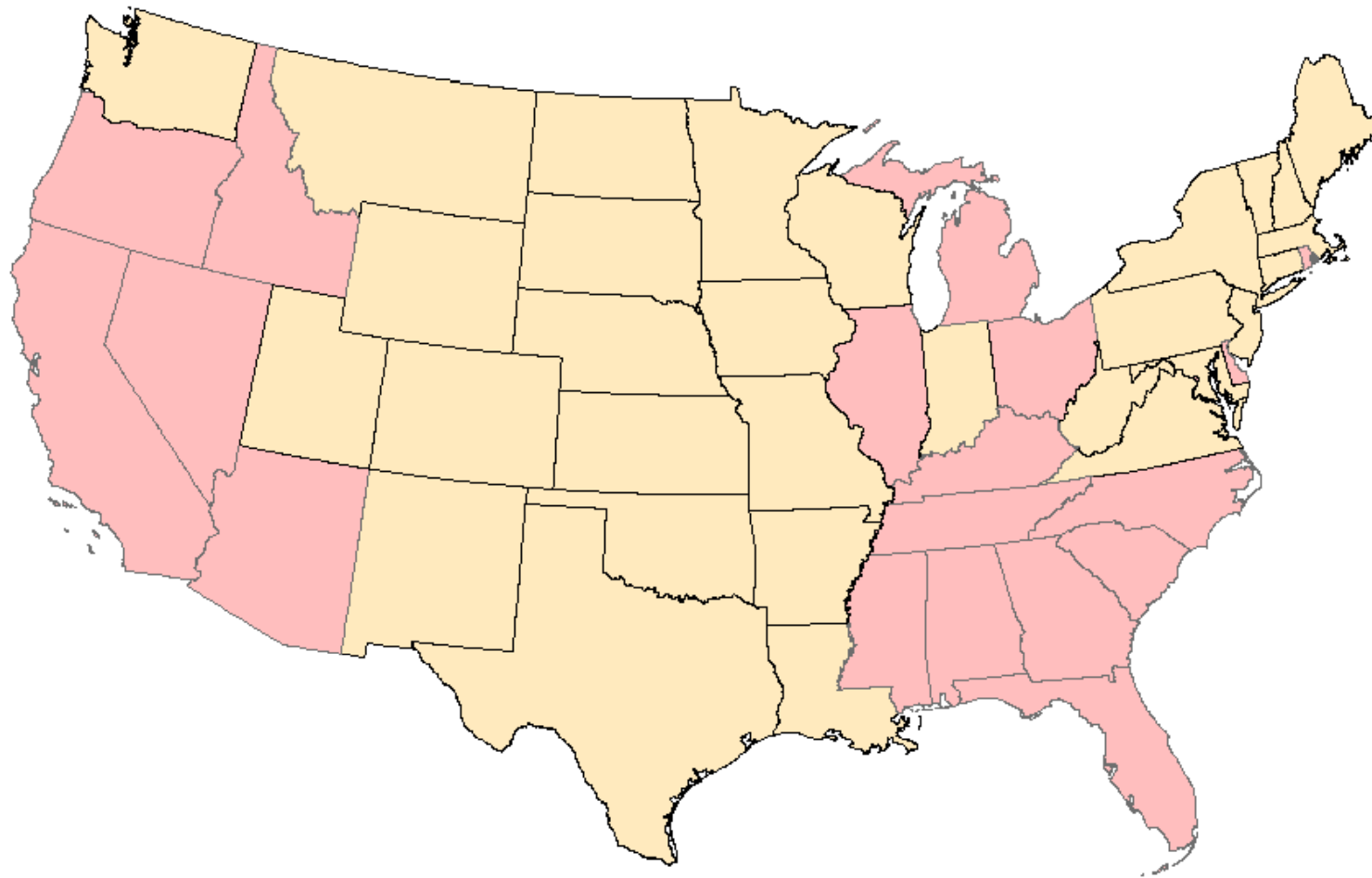


Changes in Unemployment Rates by State

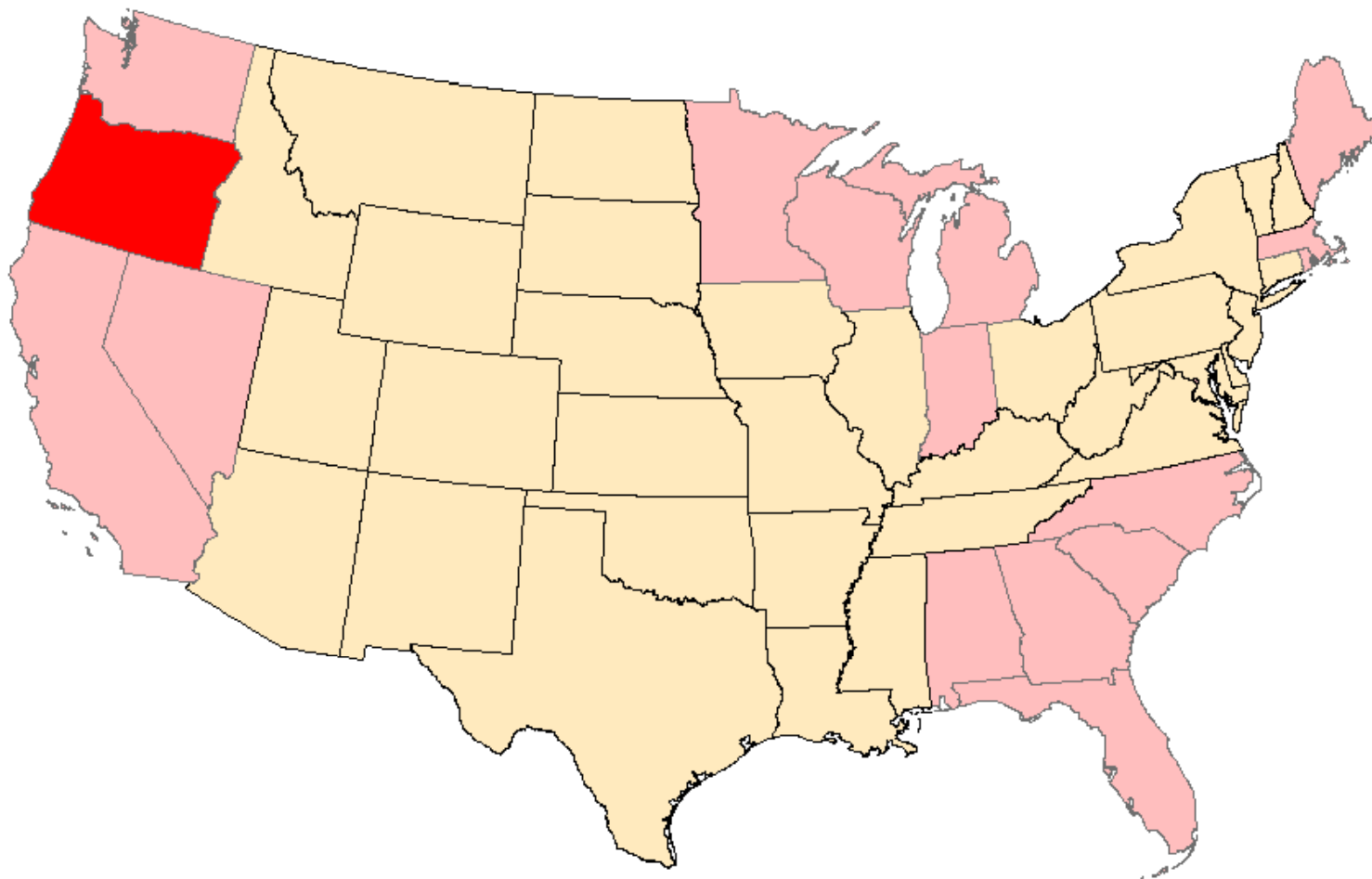
April 2008



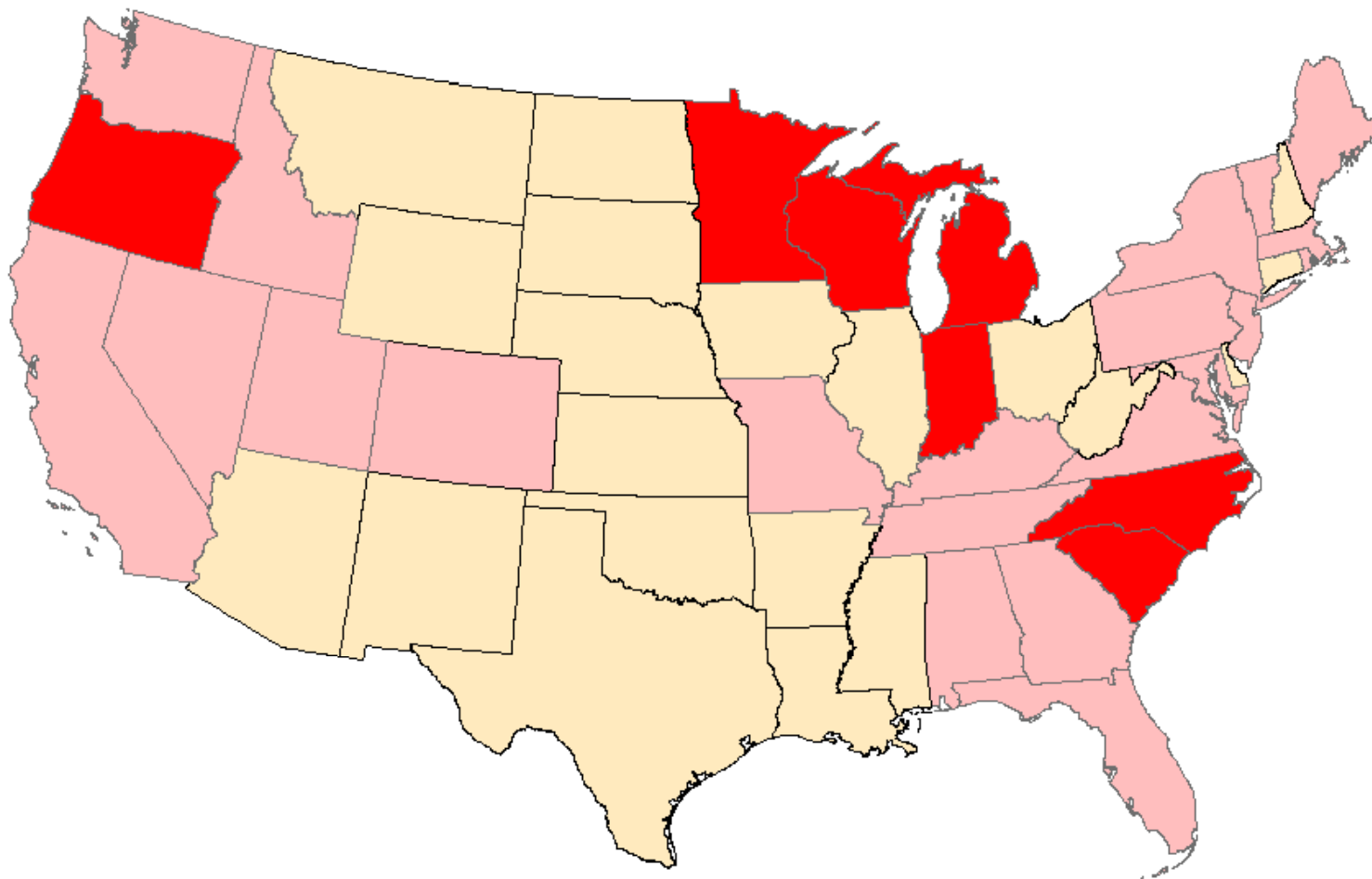
Changes in Unemployment Rates by State May 2008



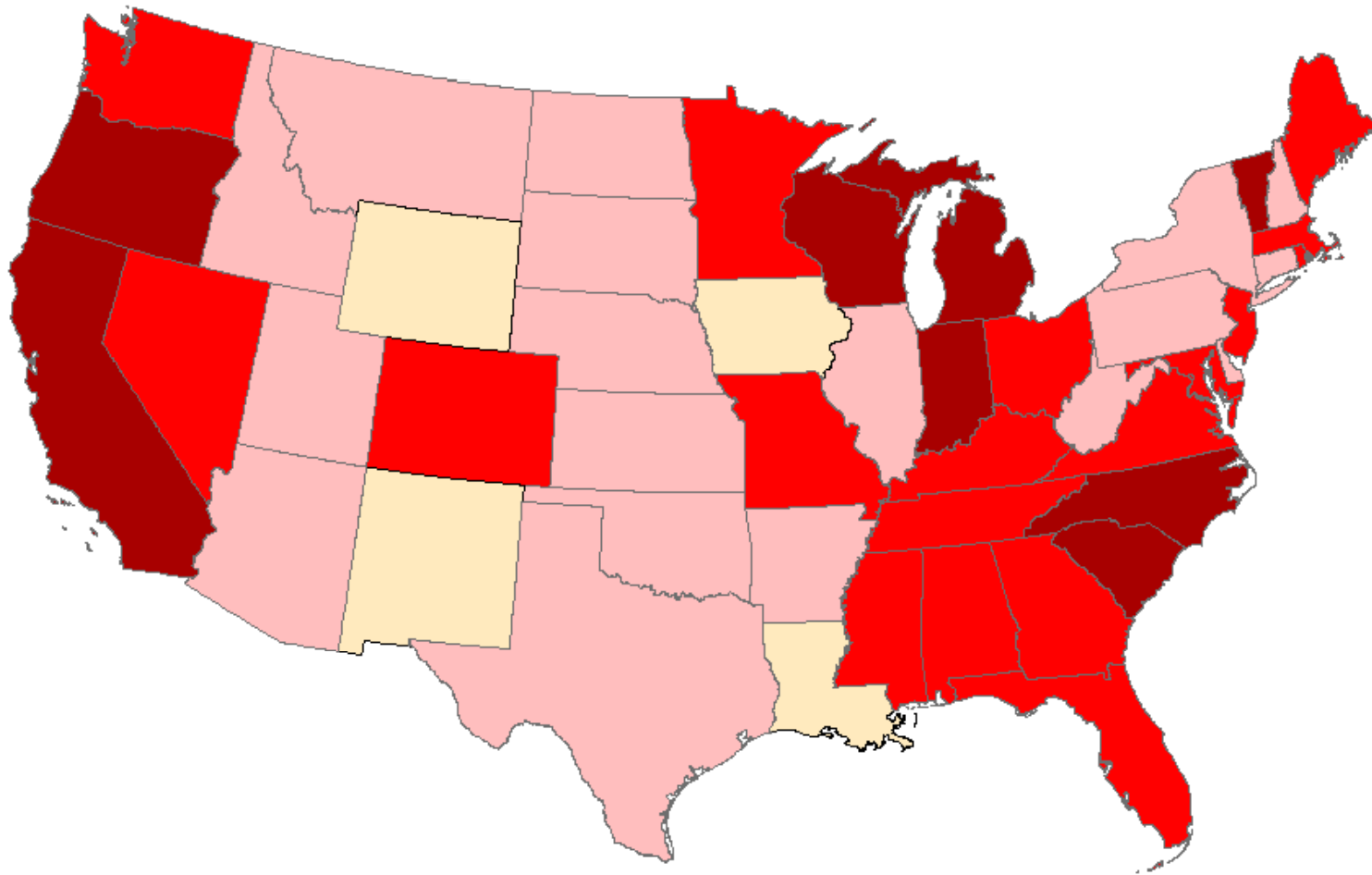
Changes in Unemployment Rates by State October 2008



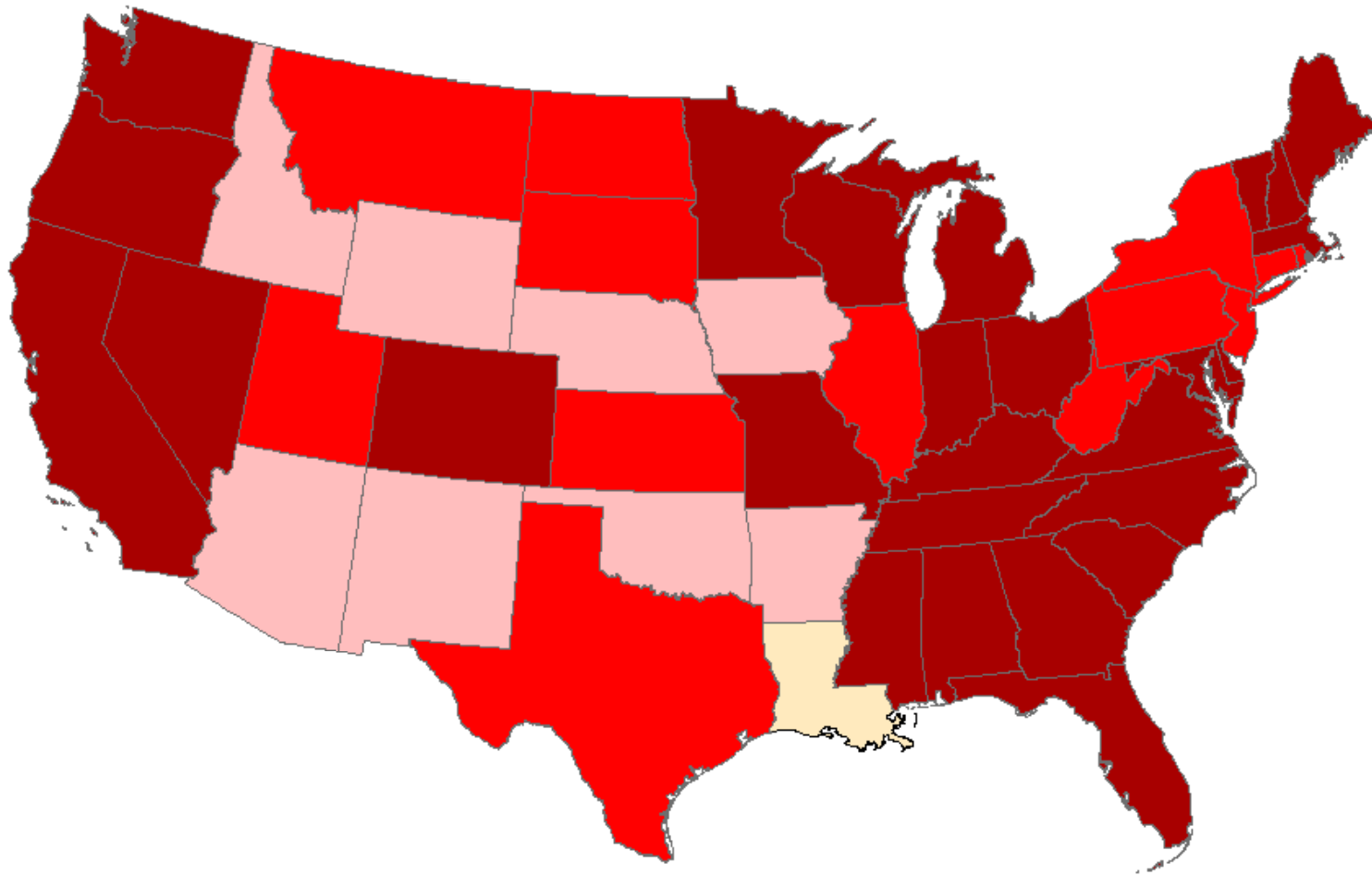
Changes in Unemployment Rates by State November 2008



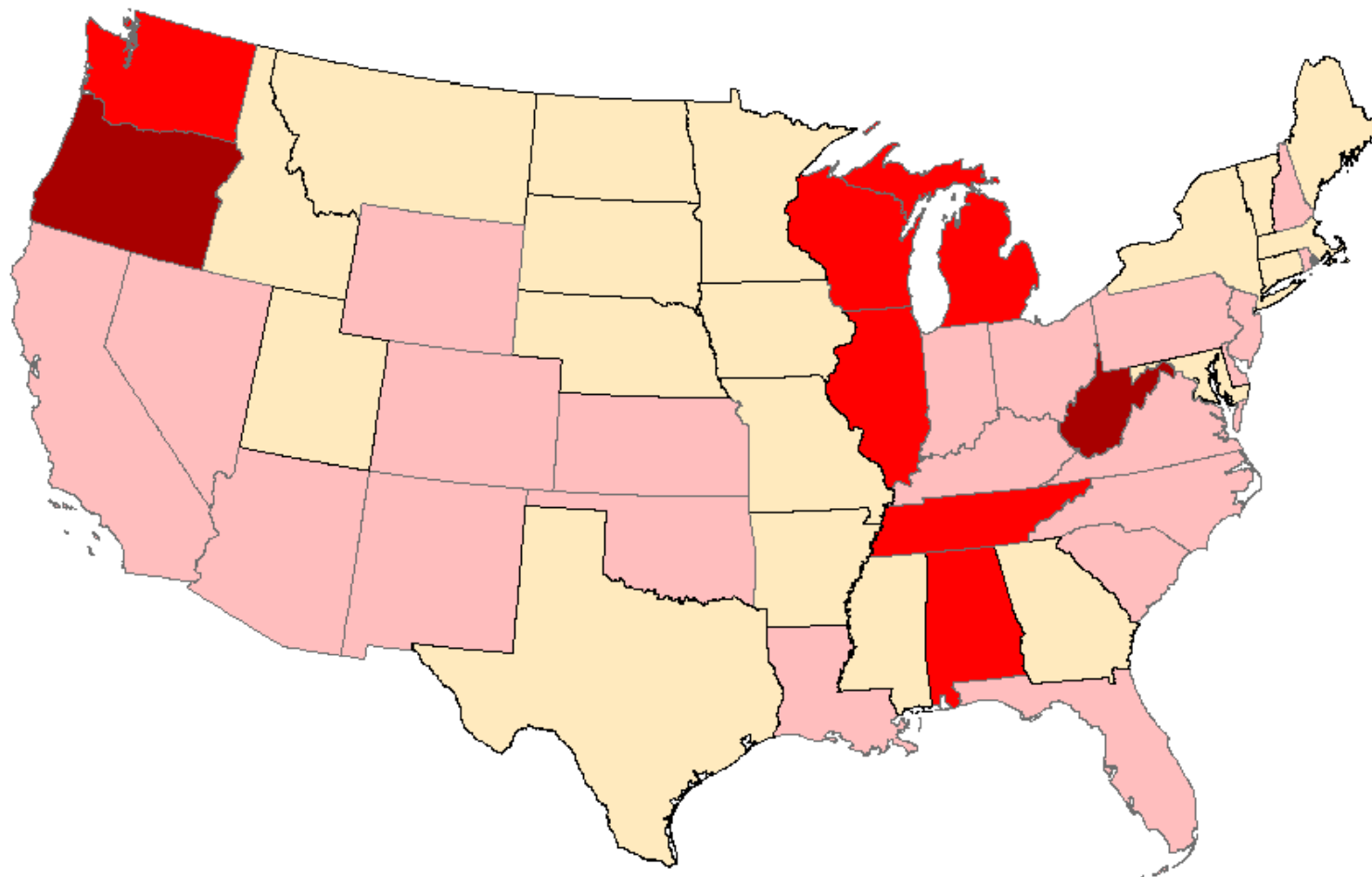
Changes in Unemployment Rates by State December 2008



Changes in Unemployment Rates by State January 2009

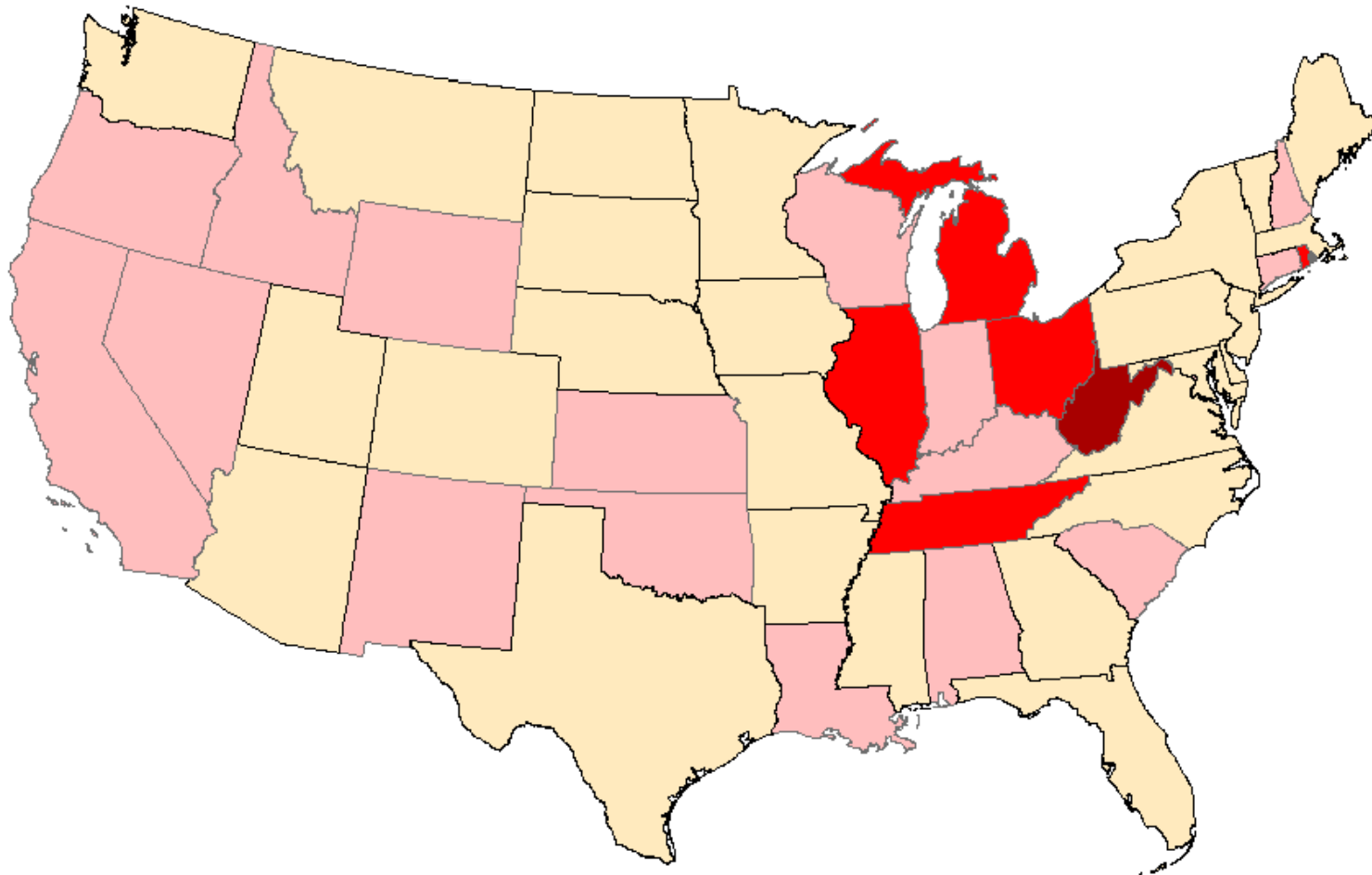


Changes in Unemployment Rates by State March 2009

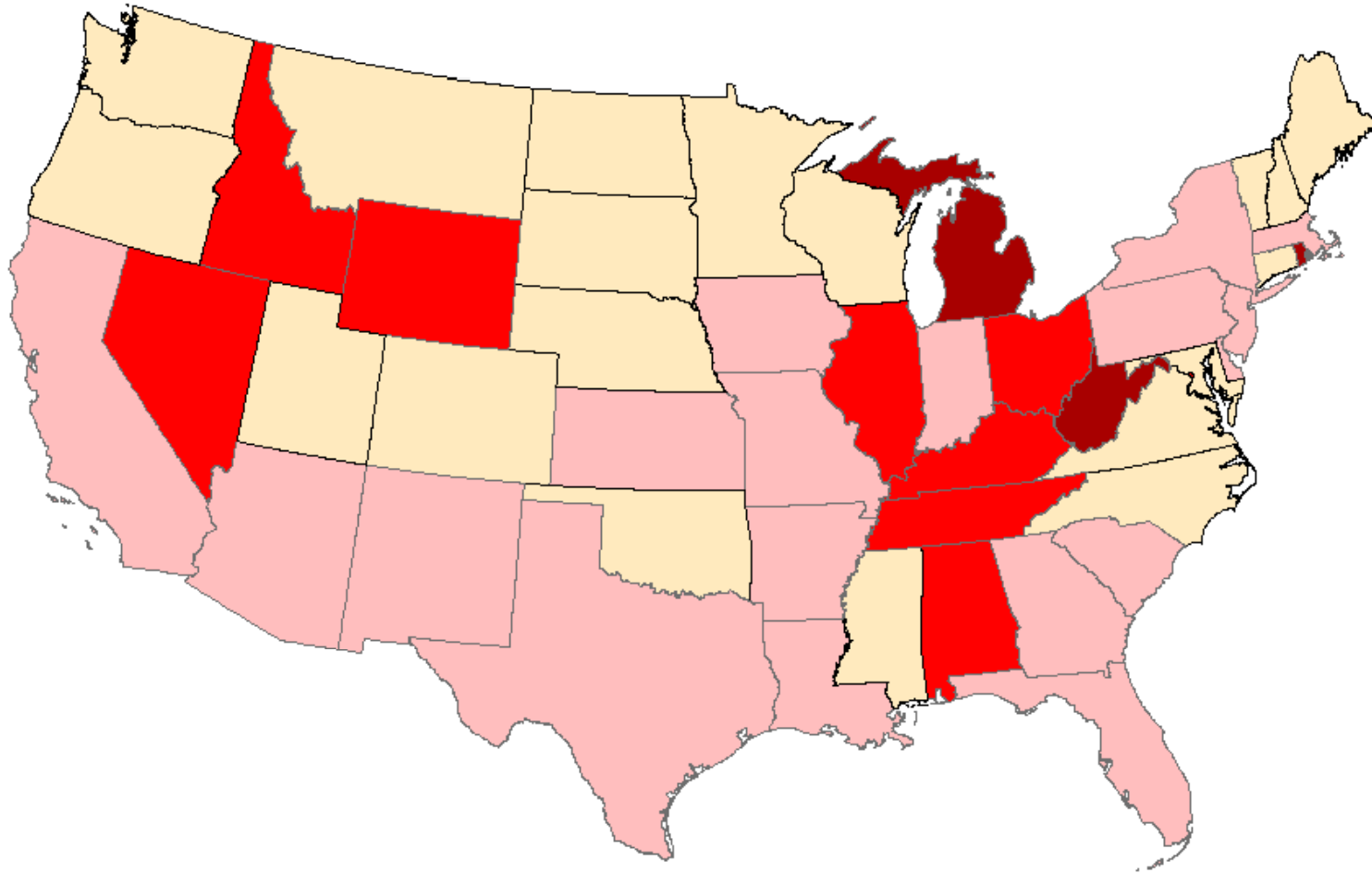


Changes in Unemployment Rates by State

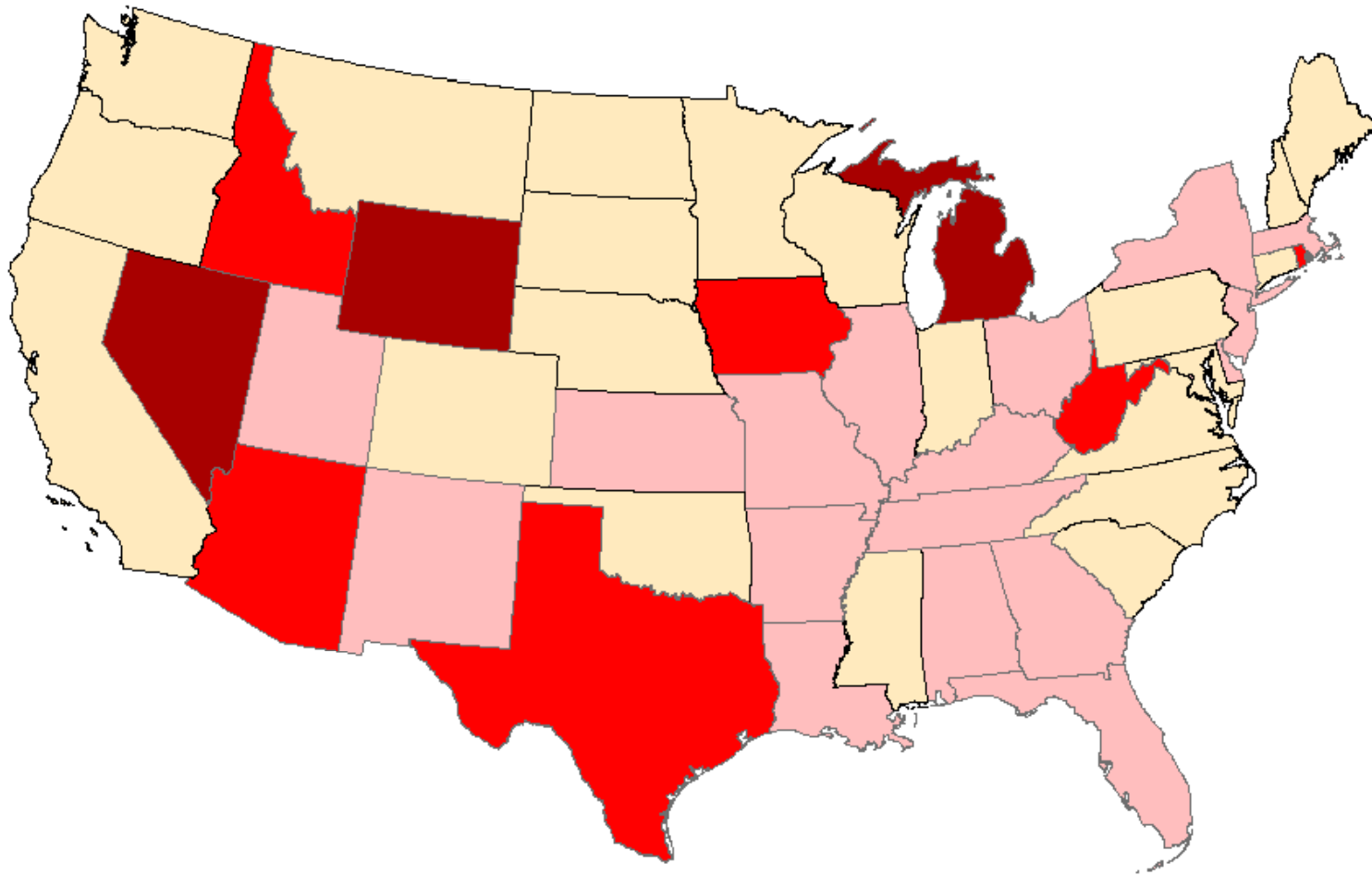
April 2009



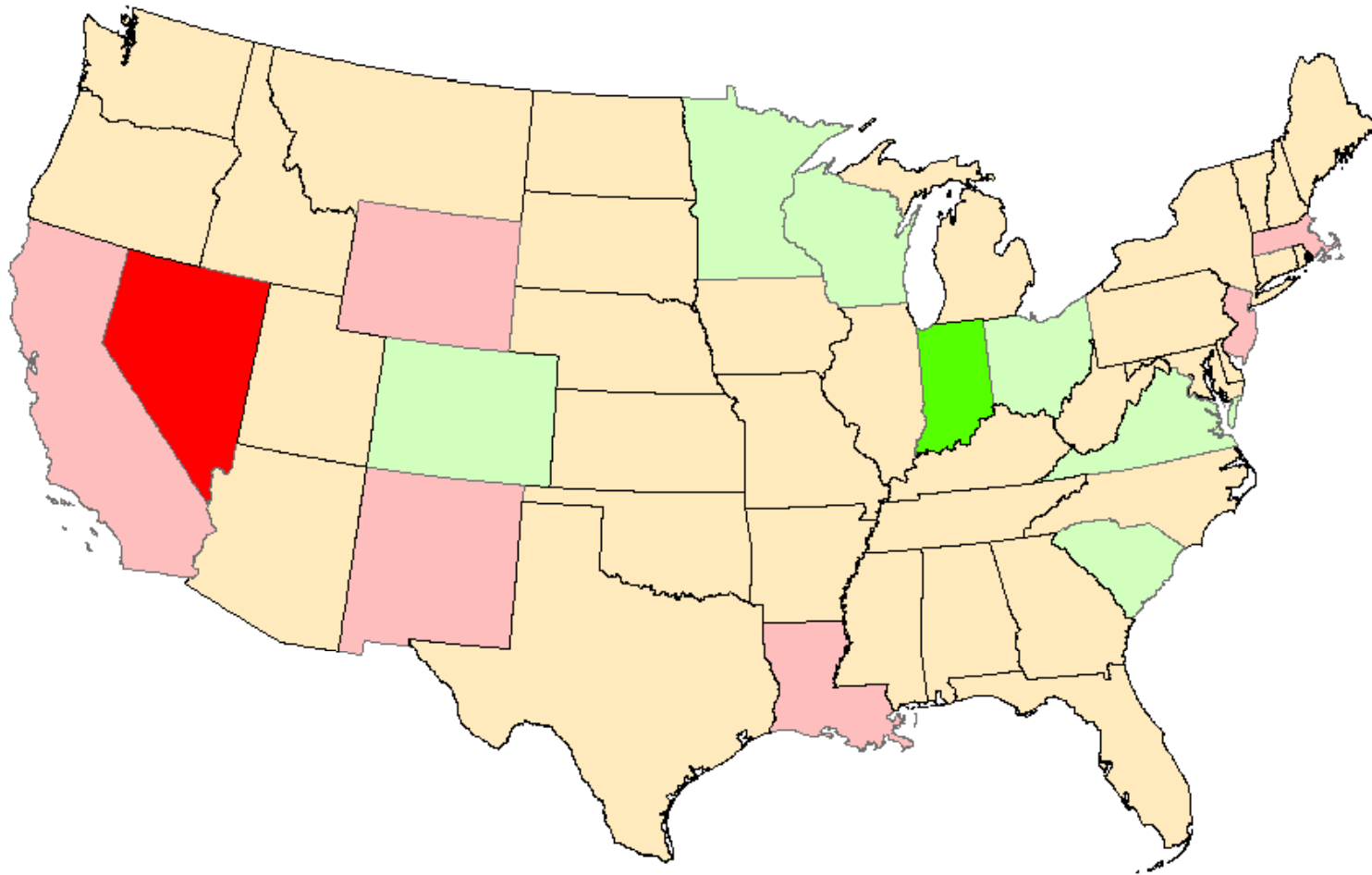
Changes in Unemployment Rates by State May 2009



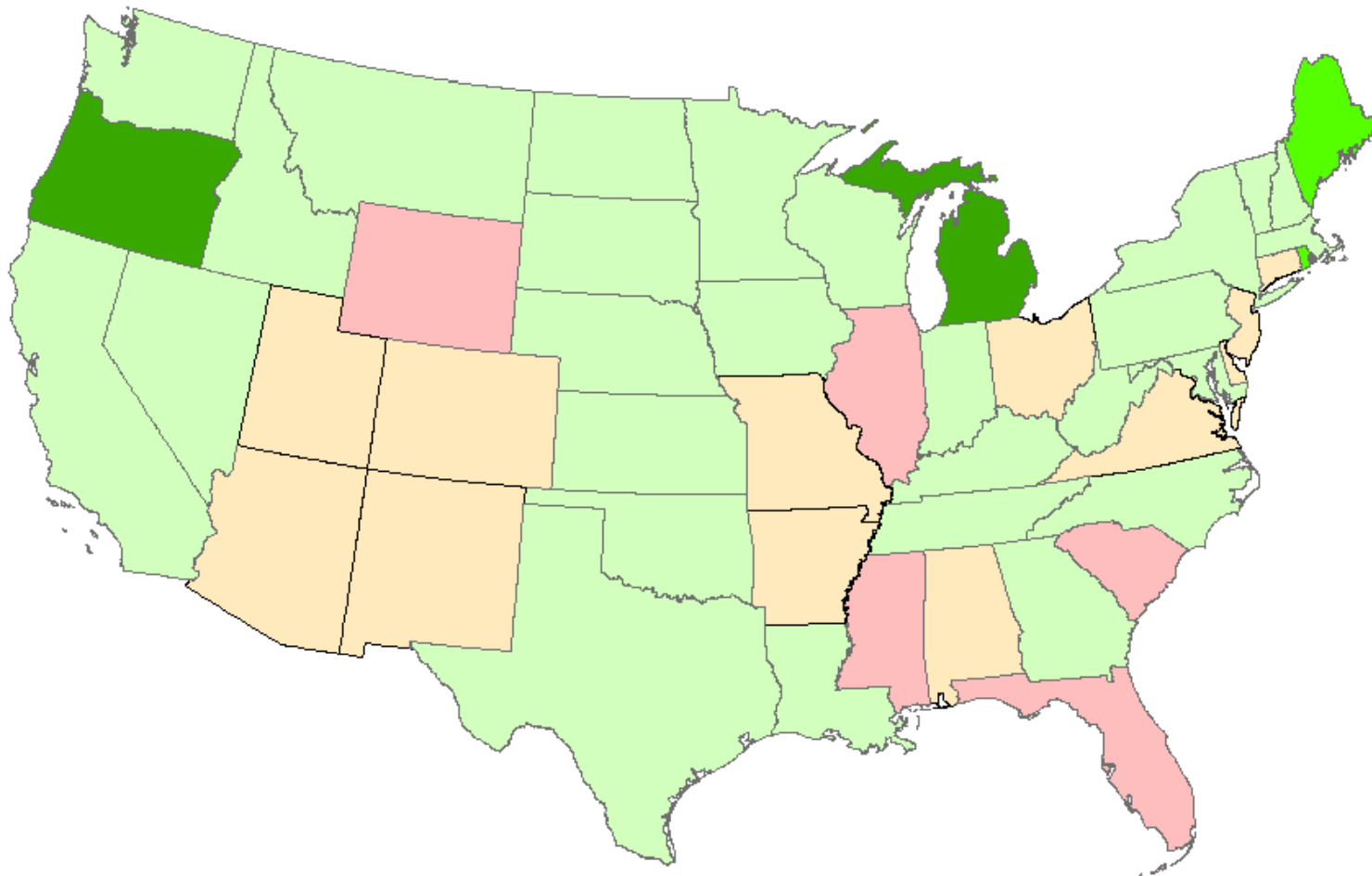
Changes in Unemployment Rates by State June 2009



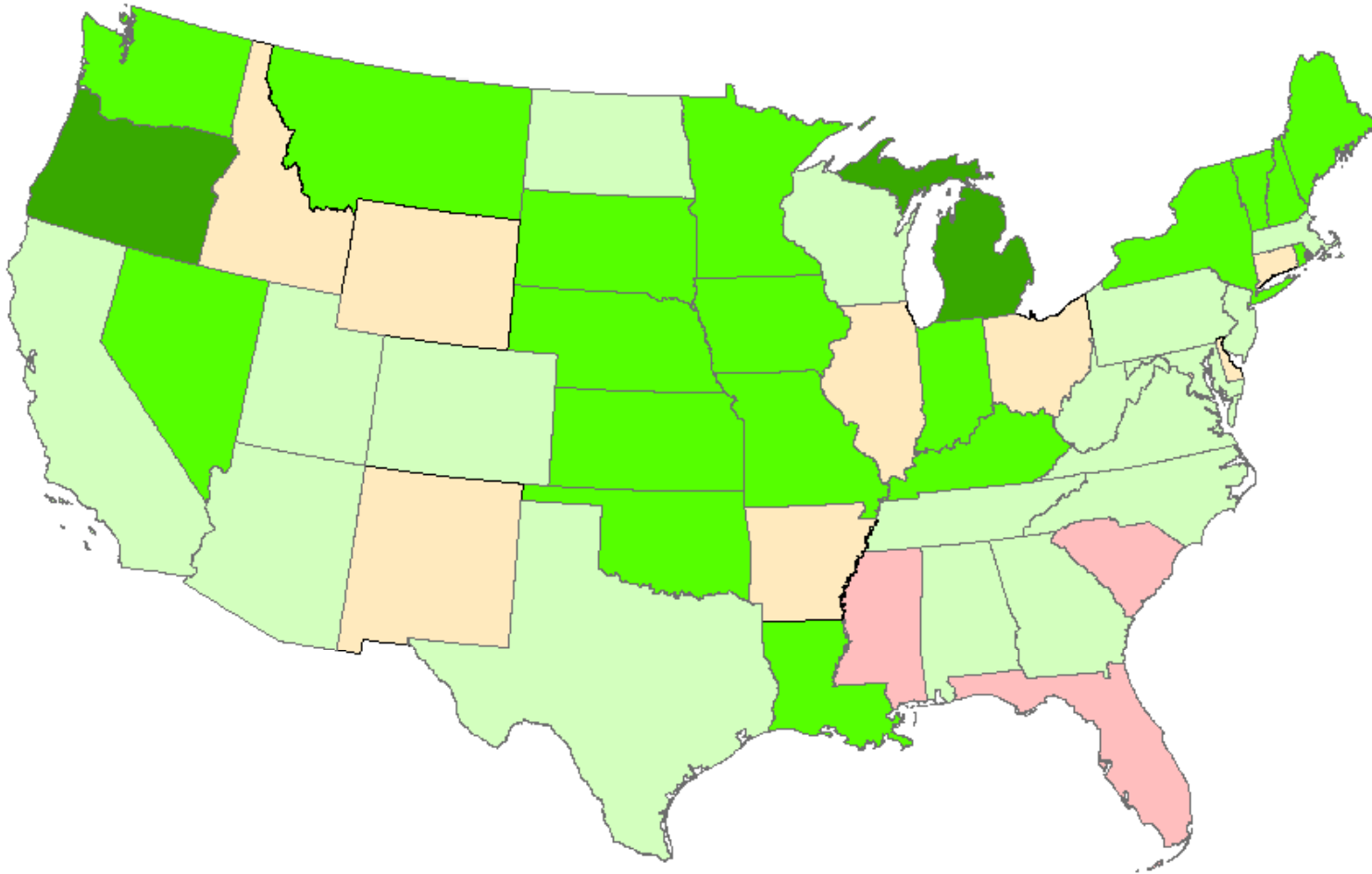
Changes in Unemployment Rates by State August 2009



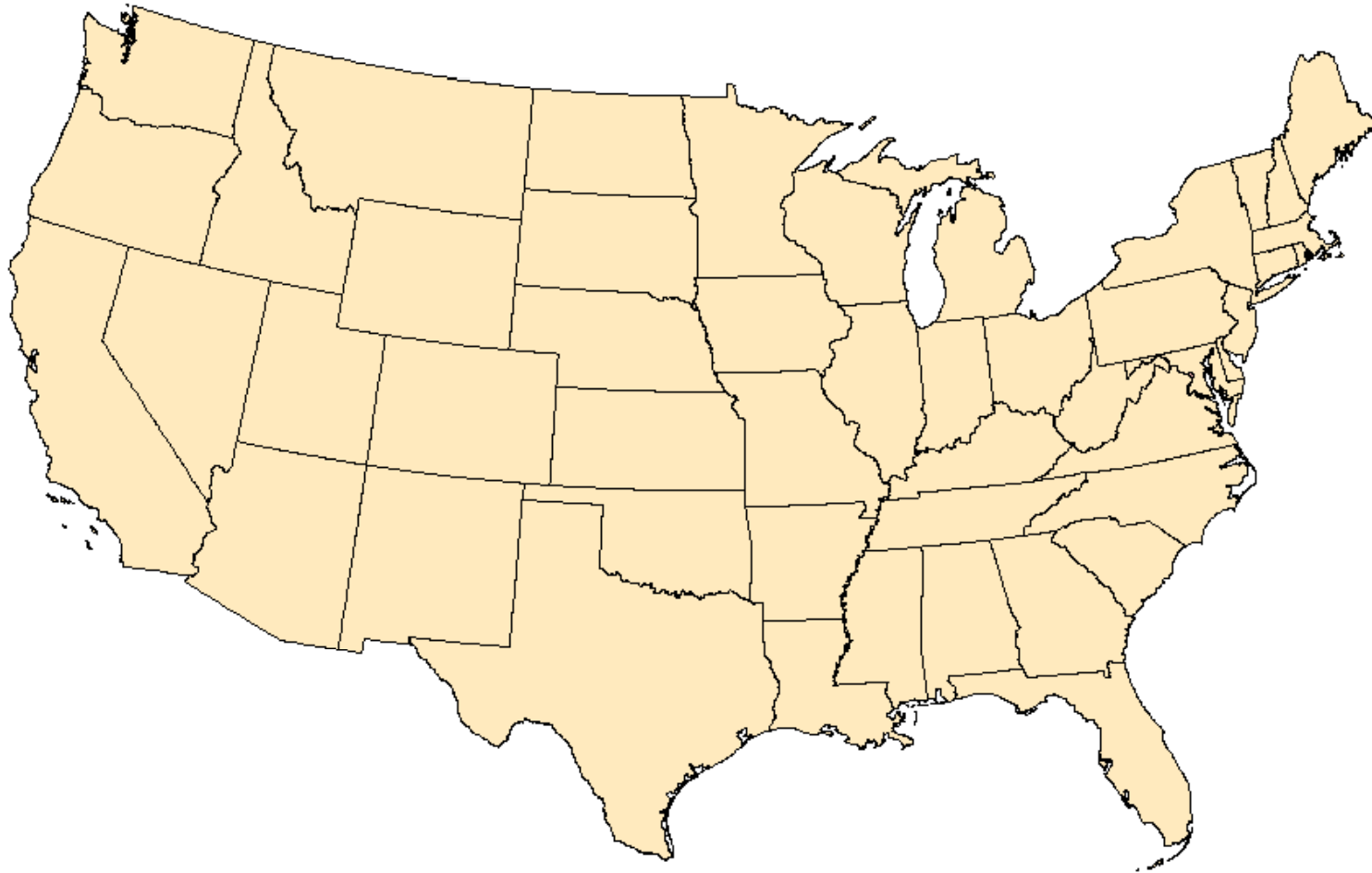
Changes in Unemployment Rates by State October 2009



Changes in Unemployment Rates by State November 2009



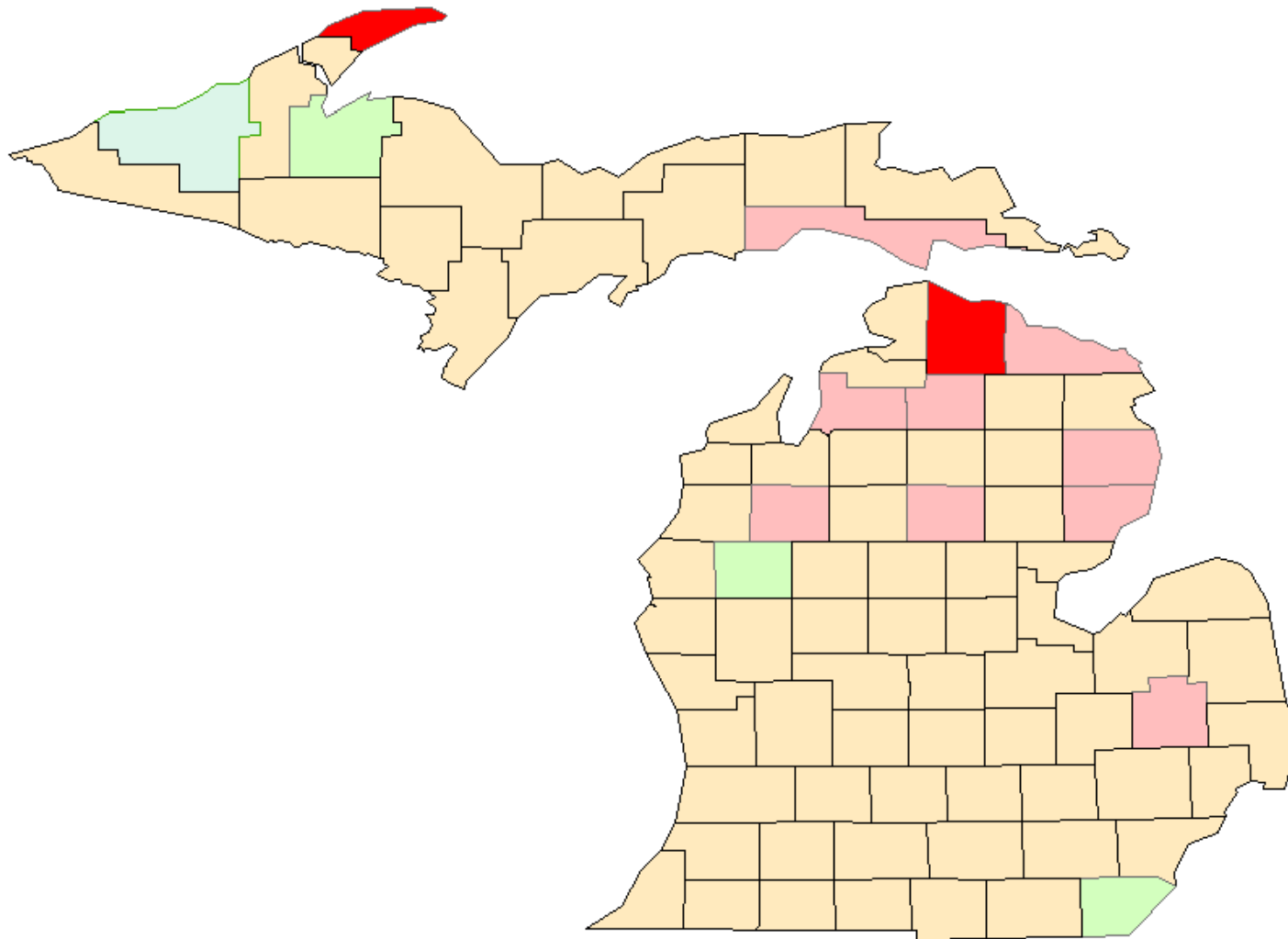
Changes in Unemployment Rates by State December 2009



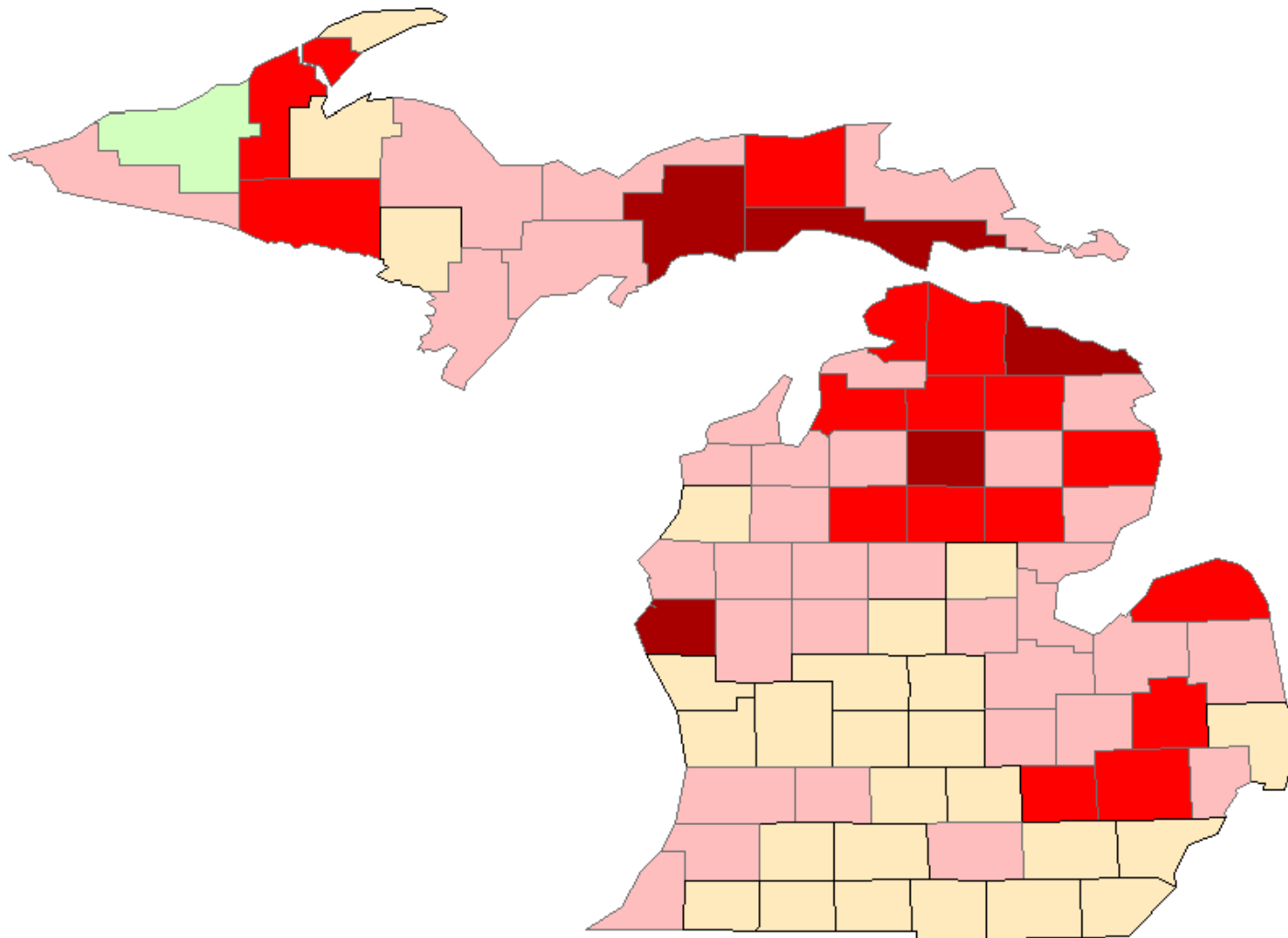
Tracing County Level Economies

- One of the origins was in the state of Michigan
- We can further study the economies within the state of Michigan

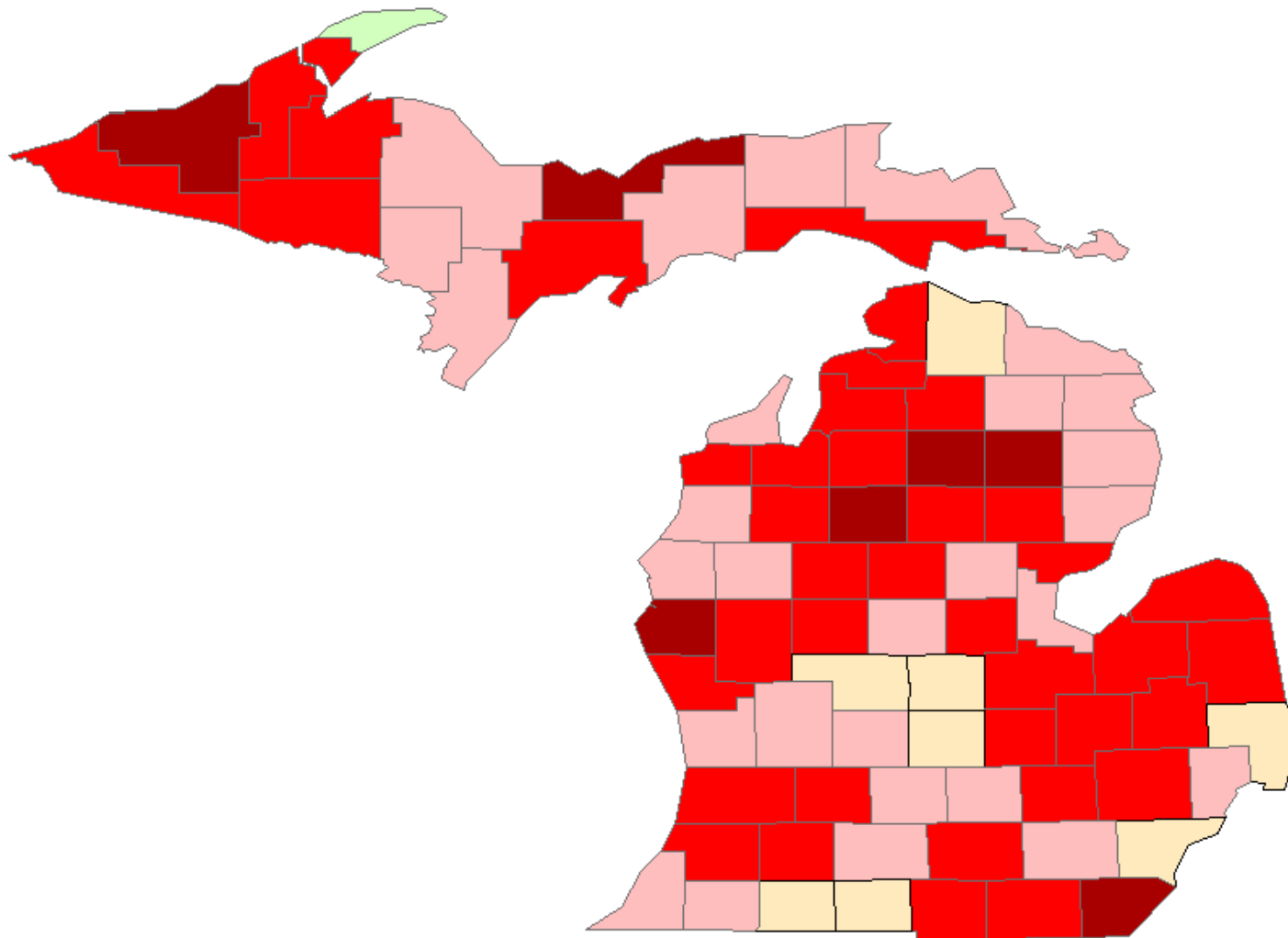
Changes in Unemployment Rates by County Michigan November 2007



Changes in Unemployment Rates by County Michigan December 2007



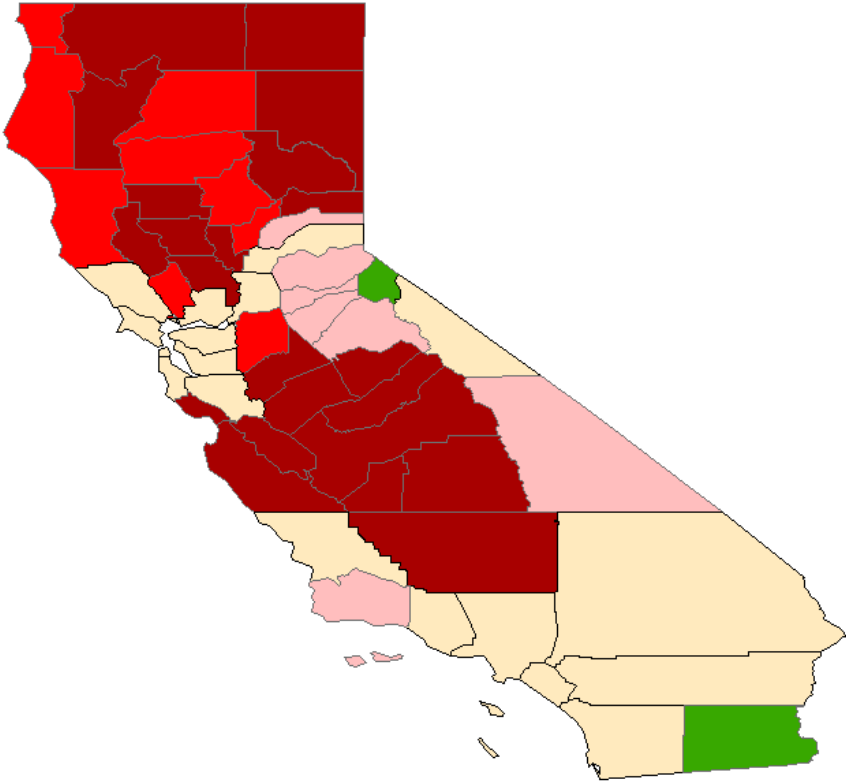
Changes in Unemployment Rates by County Michigan January 2008



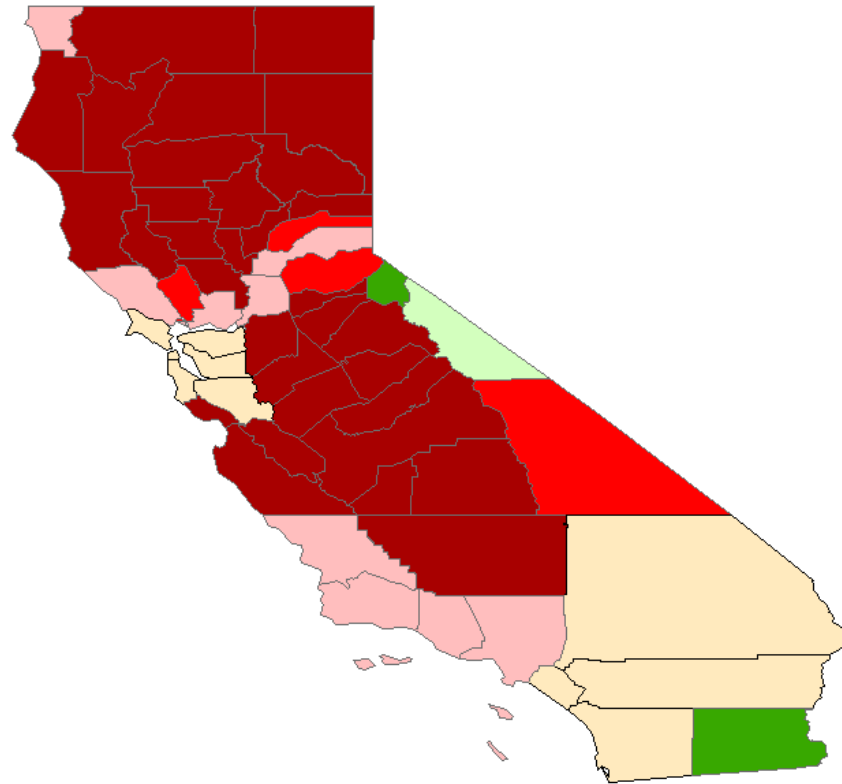
Origins of the California Recession

By county

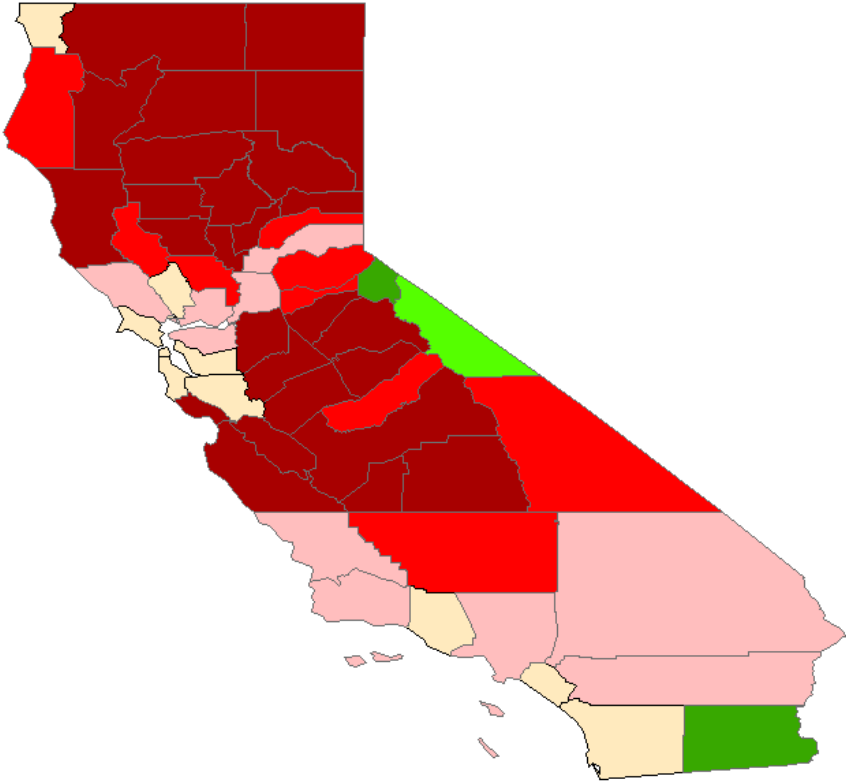
Changes in Unemployment Rates
by County
California November 2007



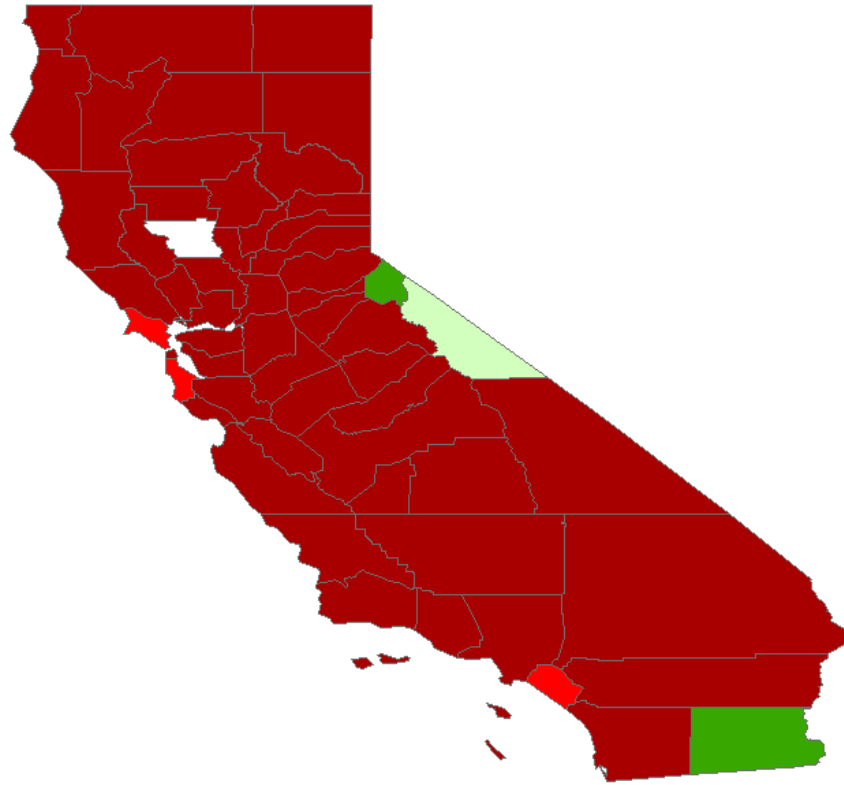
Changes in Unemployment Rates
by County
California December 2007



Changes in Unemployment Rates
by County
California January 2008

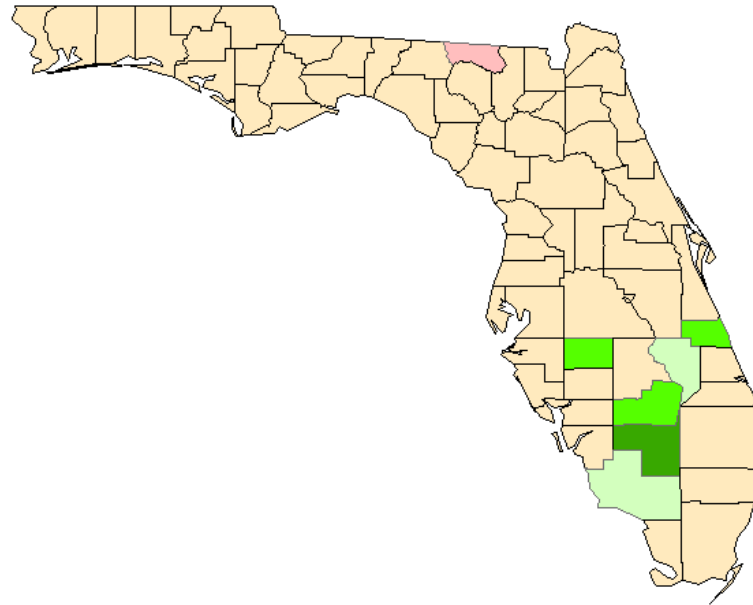


Changes in Unemployment Rates
by County
California December 2008

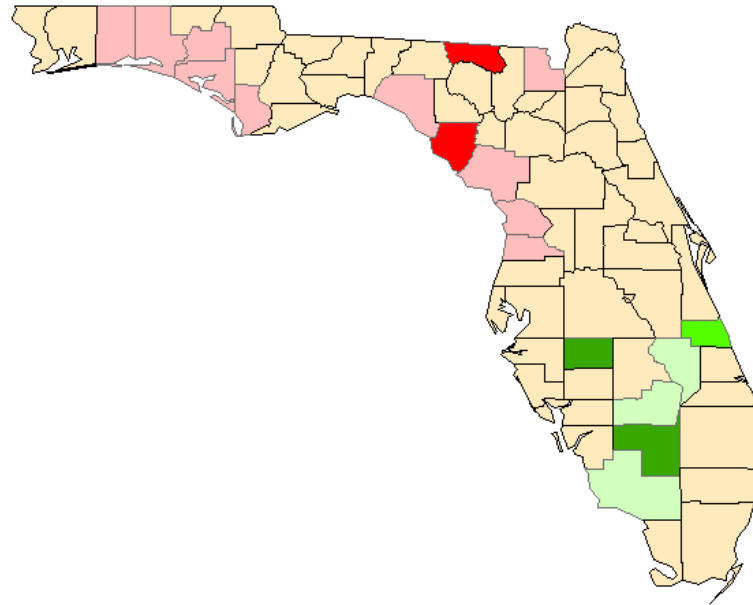


Florida and the Beginning of the Recession

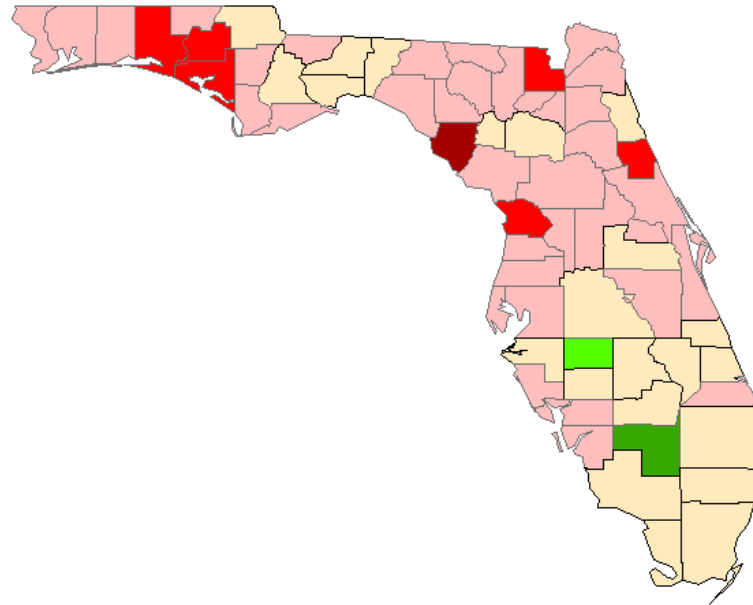
Changes in the Unemployment Rate
Florida October 2007



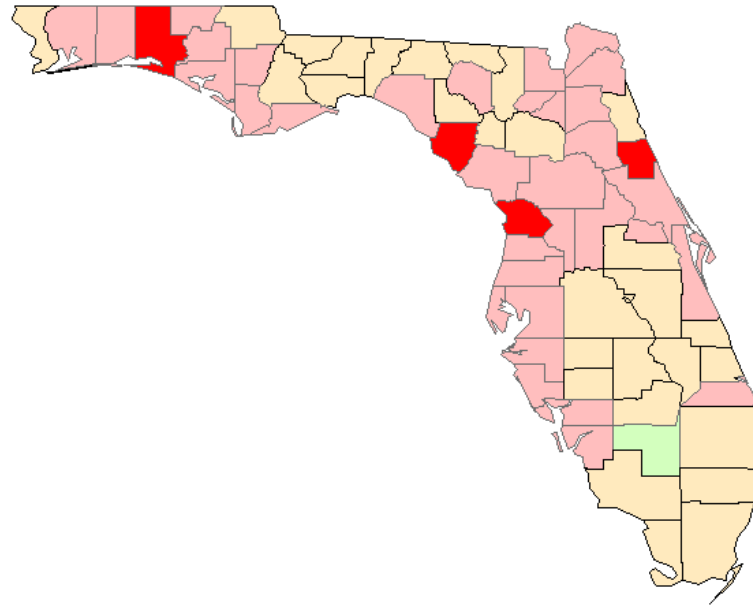
Changes in the Unemployment Rate Florida November 2007



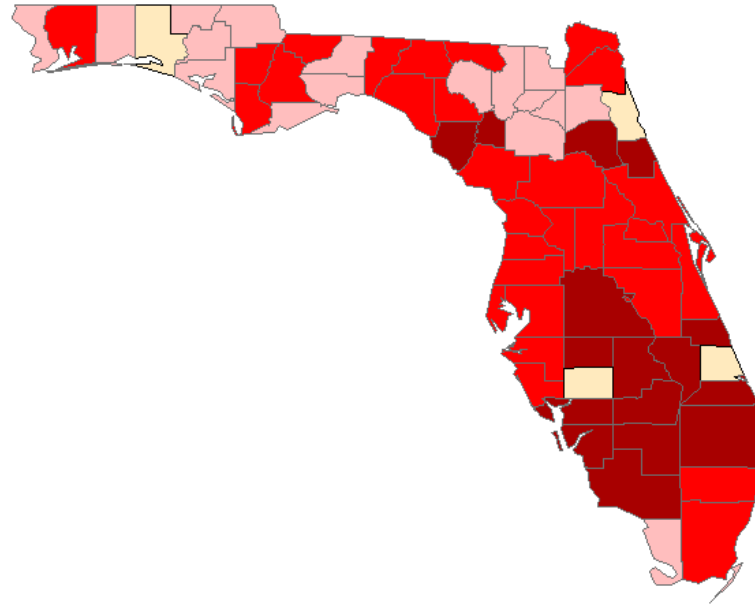
Changes in the Unemployment Rate Florida December 2007



Changes in the Unemployment Rate Florida January 2008



Changes in the Unemployment Rate Florida July 2008



Final Lessons

- An economic cycle can be studied on many different levels
 - National
 - [Multi State Regional]
 - State
 - County
- There is a strong geographic pattern to this and other recessions
- Both spatial as well as temporal components of economic cycles need to be studied