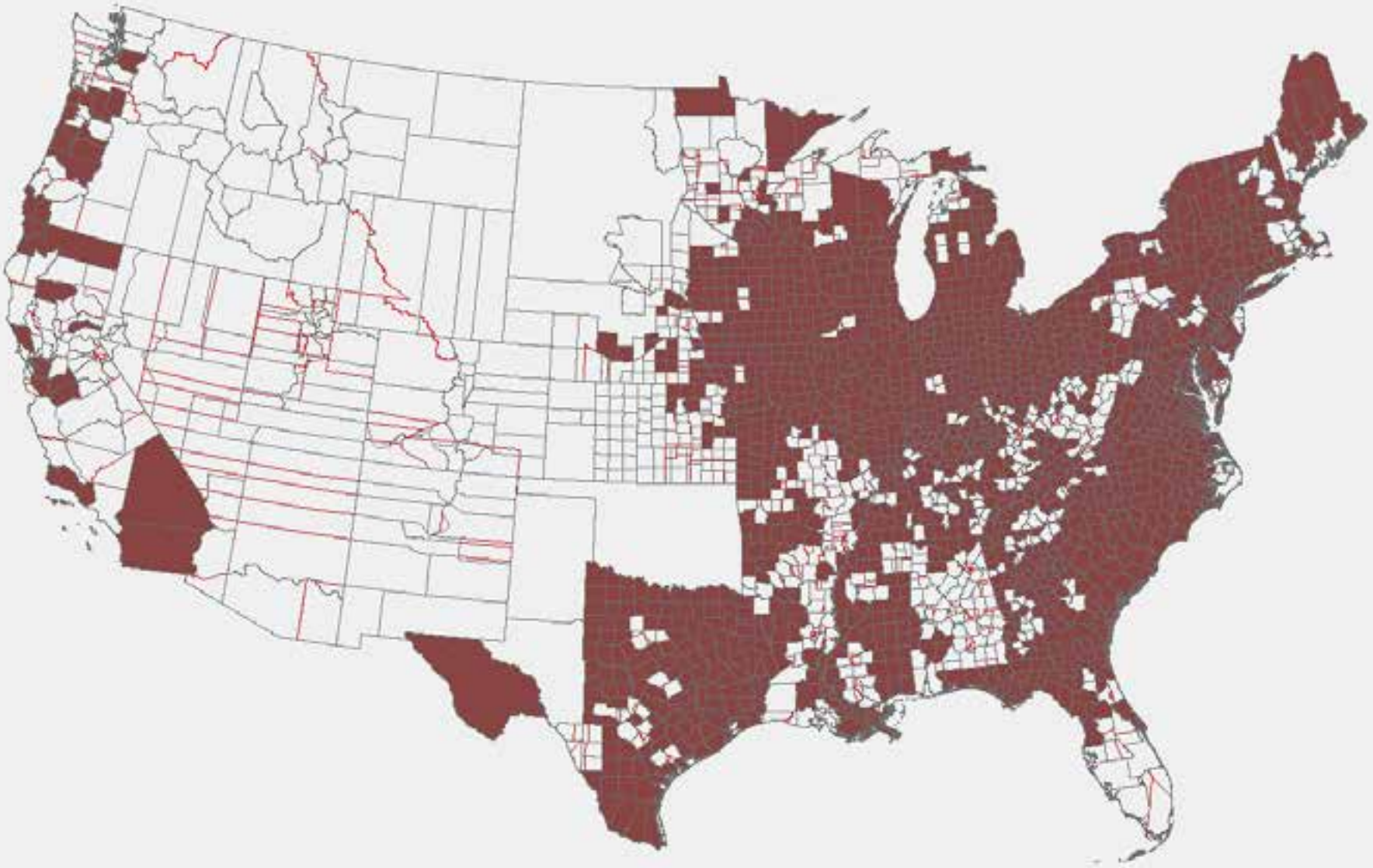
Using Rasterization to Overcome Boundary Changes

Andy Bradford

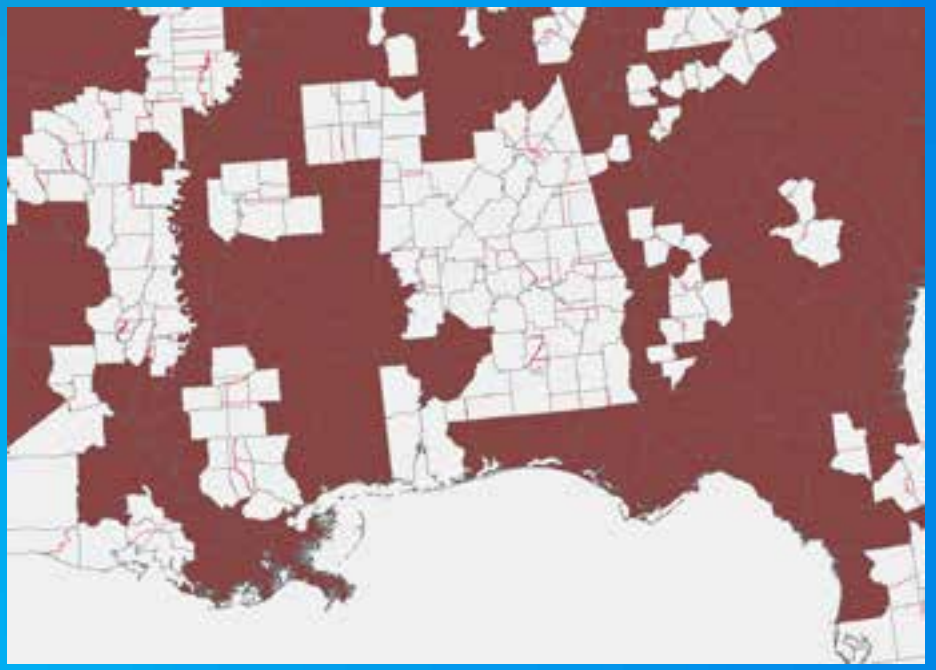
Bradford Mapping

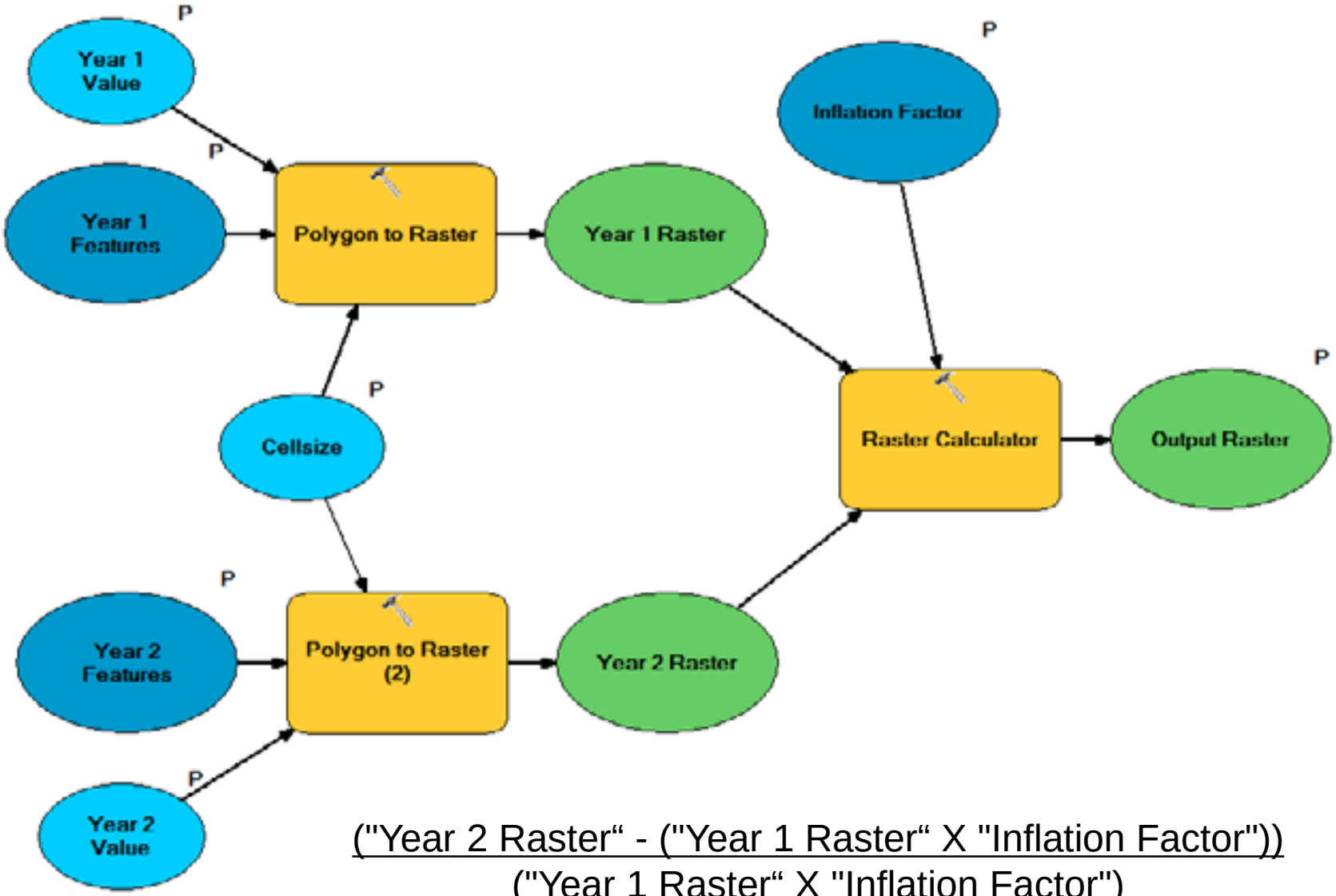
Study: Land Values, 1860-1870

- How did the Civil War and the first 5 years of Reconstruction affect land values across the US?
- Given wildly varying land values (min: $1, max: $7309) changes needed to be expressed in % difference
- Data Source: County Average Land Values, US Agricultural Census, 1860 & 1870
- From National Historical GIS (nhgis.org)
- Data in contemporary dollars per acre
- 40% inflation 1860-1870

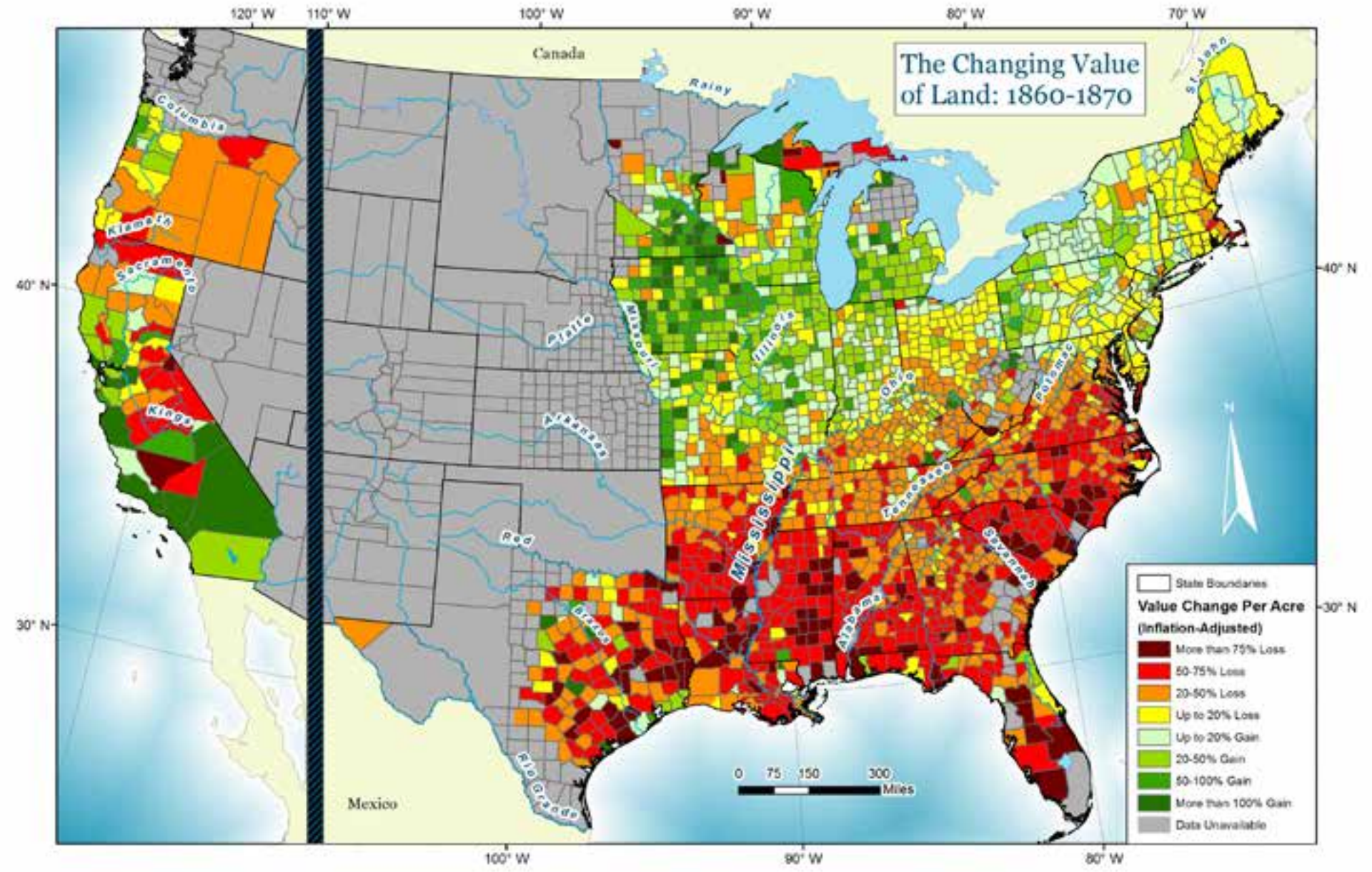


Boundary Changes



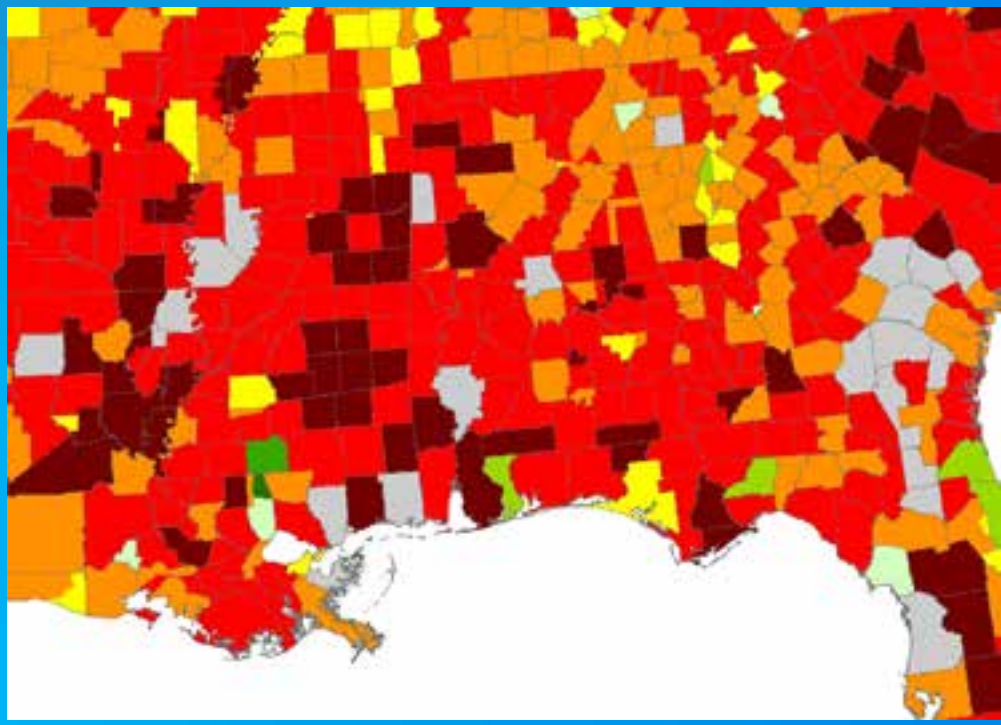


("Year 2 Raster“ - ("Year 1 Raster“ X "Inflation Factor"))
("Year 1 Raster“ X "Inflation Factor")


The Changing Value of Land: 1860-1870
Canada
Mexico
Columbia
Klamath
Sacramento
Kings
Rainy
Platte
Missouri
Arkansas
Red
Brazos
Rio Grande
Illinois
Ohio
Mississippi
Tennessee
Alabama
Savannah
Potomac
St. John
120° W
110° W
100° W
90° W
80° W
70° W
40° N
30° N
0 75 150 300 Miles
State Boundaries
Value Change Per Acre
(Inflation-Adjusted)
More than 75% Loss
50-75% Loss
20-50% Loss
Up to 20% Loss
Up to 20% Gain
20-50% Gain
50-100% Gain
More than 100% Gain
Data Unavailable

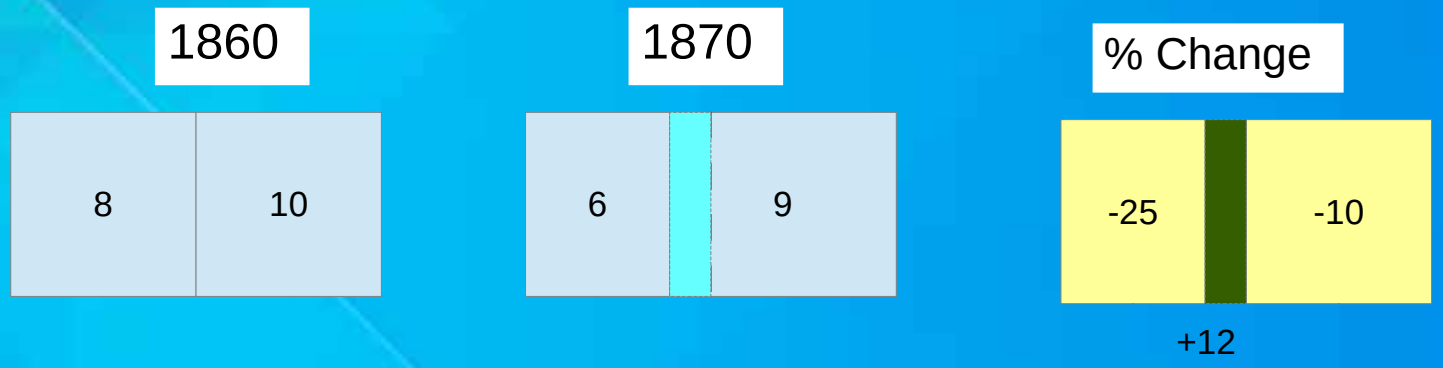
Advantages

- Easy to model
  - No statistics with difficult-to-interpret results
  - Can adjust equation for total rather than % change
- Raster can be averaged to jurisdiction boundaries for correlation with other variables



Faults

- No weighting with other variables
- Some slices that change jurisdictions can have difference values that are out of sync with either their origin or destination polygons, or regional trends.



Data Sources

Land Value Data Source: 1860&1870 Census of Agriculture, retrieved from NHGIS.
County Boundary Data: Minnesota Population Center. National Historical Geographic Information System: Version 2.0. Minneapolis, MN: University of Minnesota 2011.
Lakes and Rivers: US Census Bureau
Continent: ESRI