

Mapmaking

GIS II: Data Management



- **Consistent labeling improves map readability**
- **Proportional symbols are a useful tool for showing raw counts on maps**
- **Use inset maps to show small areas where data might otherwise be lost, or to provide missing geographic context**
- **There are several good techniques for showing multiple variables on a single map**

- **Label unambiguously**
 - **Location**
 - **Style**
- **Never let labels overlap**
- **Labeling is an iterative process, and can be very time-consuming**

Label locations: points

- If there are no other constraints, place labels for point features above and to the right of the point symbol



Capital City

- Avoid placing labels where they may be associated with more than one point



Capital City Springfield



Capital City Springfield

- Split long names onto two lines



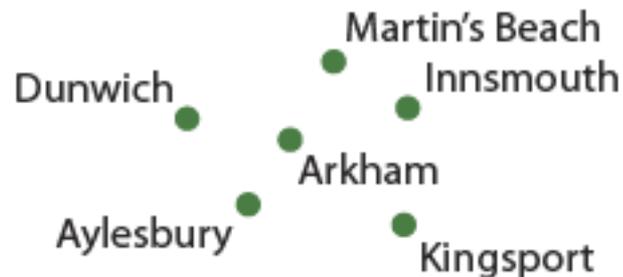
North
Haverbrook

Label locations: points

- When placing competing labels, use the following guide to preferred label placement

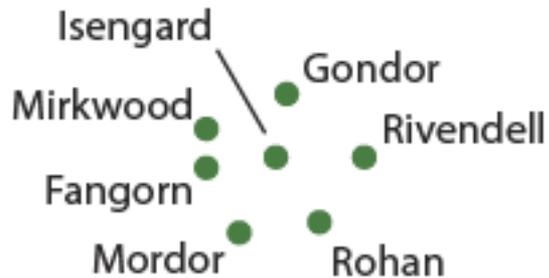
2 7 1
6 ● 5
4 8 3

- Of course, other constraints may prevent you from placing labels in the most preferred location



Label locations: points

- In truly impossible situations, use lead lines.



- Place labels inside the polygon that contains the point (that is, avoid crossing borders with labels).



Label locations: points

- For features that border water, place labels in the water. For features that don't border water, place labels in land.



- For features that cross lines, place labels across the lines. For features that don't cross lines, keep the labels on one side of the line.



Label locations: lines

- Label line features above the line
- Never place label text upside-down (or past the vertical)
- For long lines, place multiple labels; don't spread text out



Label locations: polygons

- Spread text out to cover the whole polygon
- Avoid placing labels outside the polygon; rotate text if you must

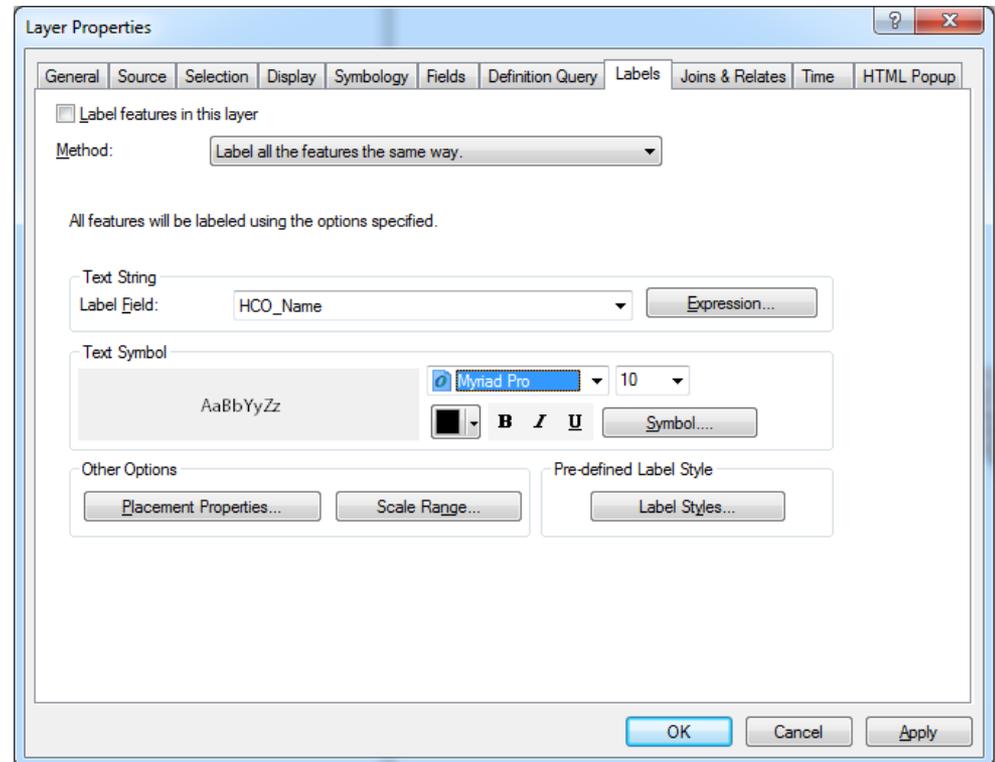


- If a polygon is too small to fit a label inside, place the label as if it were a point feature



- **Use sans-serif fonts for cultural features (cities, counties, hospitals); use serif fonts for geographic features (rivers, mountains, oceans)**
- **Never use more than three fonts on a map**
- **Vary font sizes by at least two points for different categories**
- **Try to avoid using fonts smaller than 6 points**

- Label properties are available in the Layer Properties window
- Convert labels to annotations if you want to place them manually.



- **Choropleth maps are good for showing rates, but bad for showing raw totals**
- **Proportional symbol maps are good for showing rates and raw totals**
- **Proportional symbols are sized independently of geography, and therefore depend only on the data value for visual prominence.**
- **Symbols can be used for point data or area data**
- **Symbols can vary continuously (proportional symbols) or be classed (graduated symbols)**
- **Map users may mistakenly assign geographic meaning to the symbols**

- How to make one in ArcMap

Layer Properties

General Source Selection Display Symbology Fields Definition Query Labels Joins & Relates Time HTML Popup

Show:

- Features
 - Categories
 - Quantities
 - Graduated colors
 - Graduated symbols
 - Proportional symbols
 - Charts
 - Multiple Attributes

Draw quantities using symbol size to show relative values. Import...

Fields
Value: NBR_LICENS

Classification
Quantile
Classes: 5 Classify...

Normalization: none

Symbol Size from: 4 to: 18

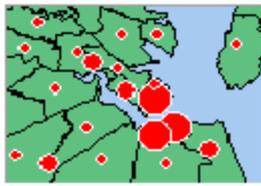
Symbol	Range	Label
◆	0	0
●	1 - 45	1 - 45
●	46 - 88	46 - 88
●	89 - 197	89 - 197
●	198 - 845	198 - 845

Template

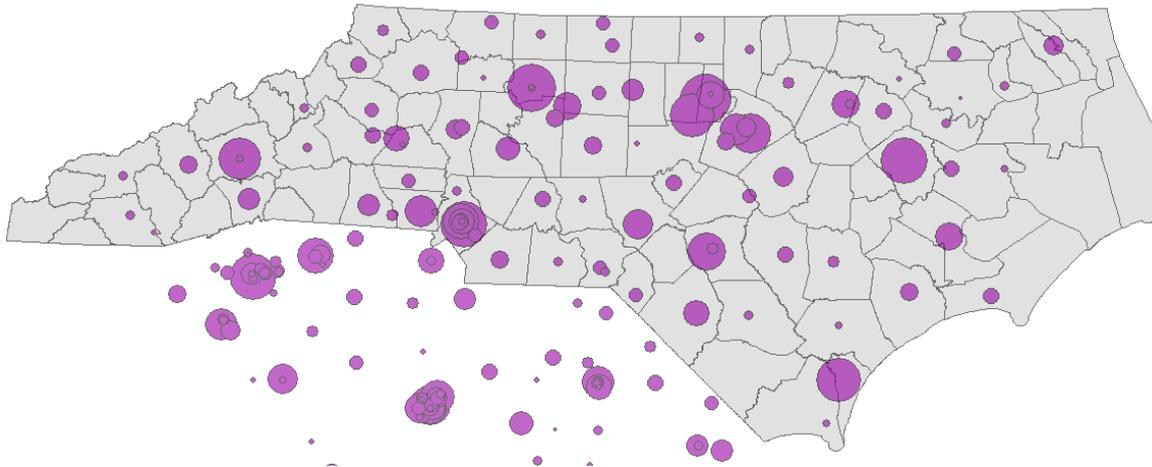
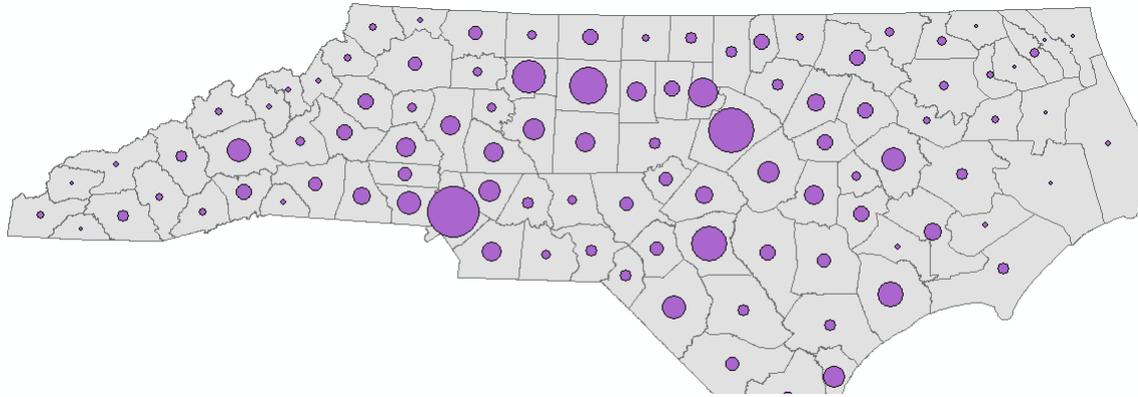
Show class ranges using feature values

Advanced

OK Cancel Apply

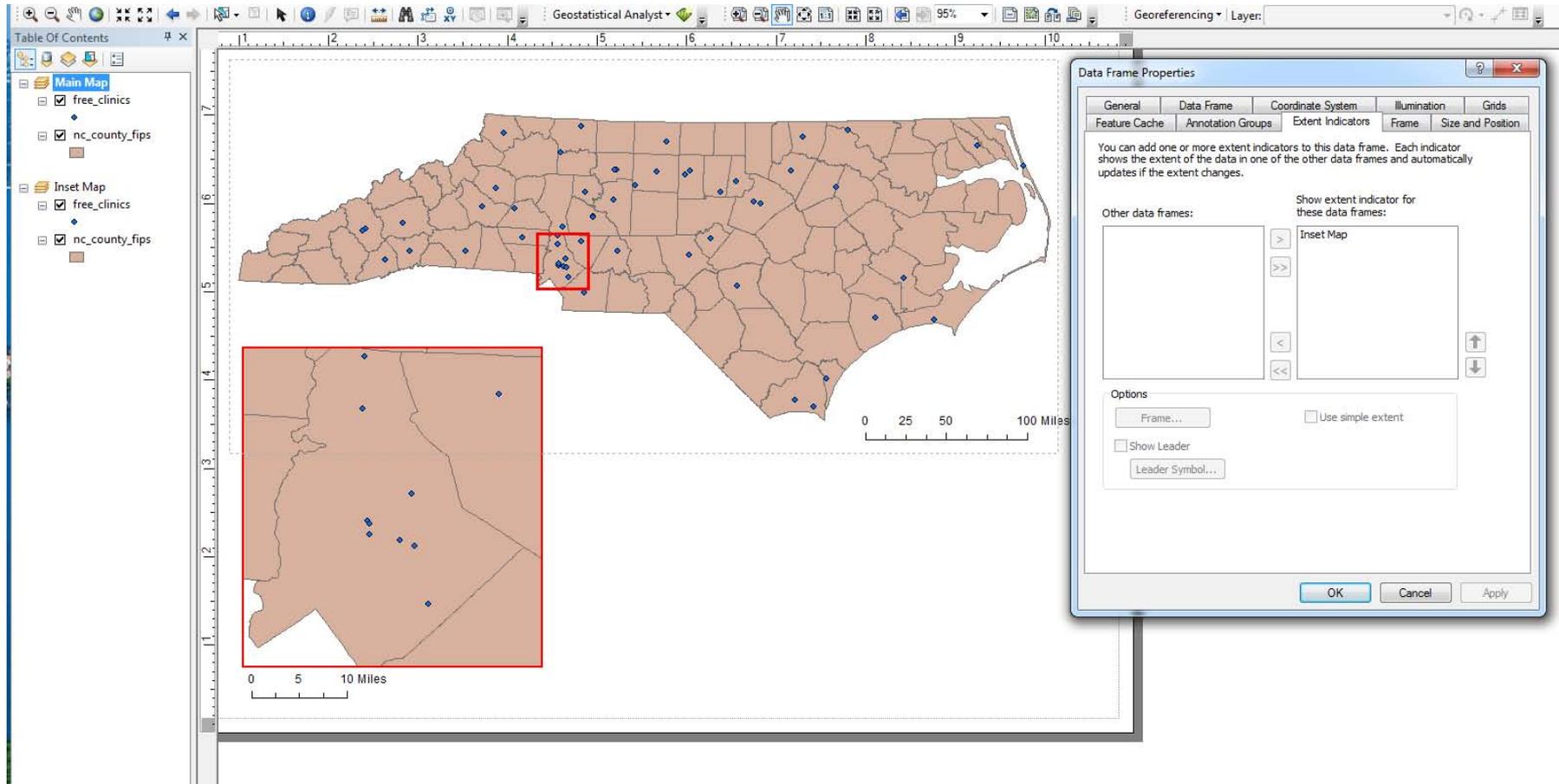


Proportional Symbol Maps



- **Show geographic context missing from the main map (locator maps)**
- **Show larger-scale maps of locations that need more detail**
 - **Overlapping points**
 - **Difficult labeling situations**

• How to make one in ArcMap



The screenshot displays the ArcMap interface with the following elements:

- Table of Contents:** Shows two map frames: 'Main Map' and 'Inset Map'. Both frames contain the layers 'free_clinics' (represented by blue diamonds) and 'nc_county_fips' (represented by brown polygons).
- Main Map:** A map of North Carolina showing county boundaries and free clinic locations. A red rectangle highlights a specific region in the western part of the state. A scale bar below the map indicates 0, 25, 50, and 100 miles.
- Inset Map:** A zoomed-in view of the region highlighted in the main map, showing a detailed view of the county boundaries and free clinic locations. A scale bar below the inset map indicates 0, 5, and 10 miles.
- Data Frame Properties Dialog Box:** Opened on the 'Frame' tab. It shows the 'Inset Map' data frame selected in the 'Other data frames' list. The 'Show extent indicator for these data frames' checkbox is checked. The 'Options' section includes a 'Frame...' button, a 'Show Leader' checkbox, and a 'Leader Symbol...' button. The 'Use simple extent' checkbox is unchecked.

- **General guidelines:**
 - Point symbols on top of lines; lines on top of polygons
 - Physical features on top of political boundaries
 - Labels on top of everything else
- **Multiple variables:**
 - Small multiples
 - Change maps
 - Proportional symbols on top of choropleth maps

- **Many maps of the same geographic area, each showing a different variable (demographic subgroup, time period)**
- **May have one large map showing the most important variable**
- **Consider carefully whether to keep the classification scheme the same between maps**

Small Multiples

African American Smoker Female Infant



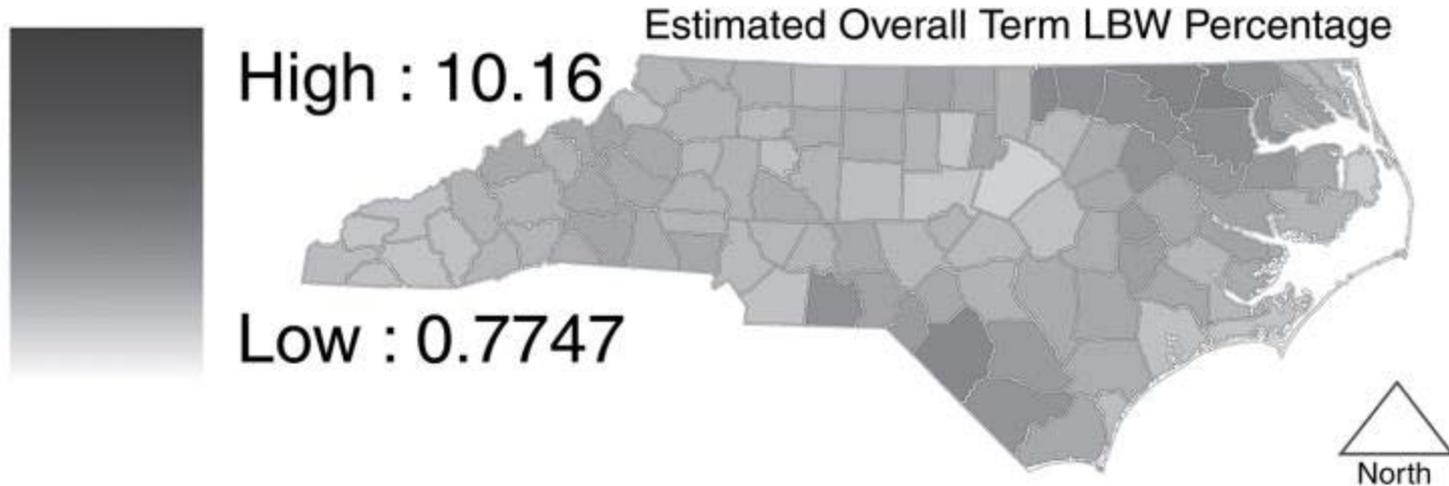
African American Non-Smoker Female Infant



African American Smoker Male Infant



African American Non-Smoker Male Infant



White Smoker Female Infant



White Non-Smoker Female Infant



White Smoker Male Infant



White Non-Smoker Male Infant

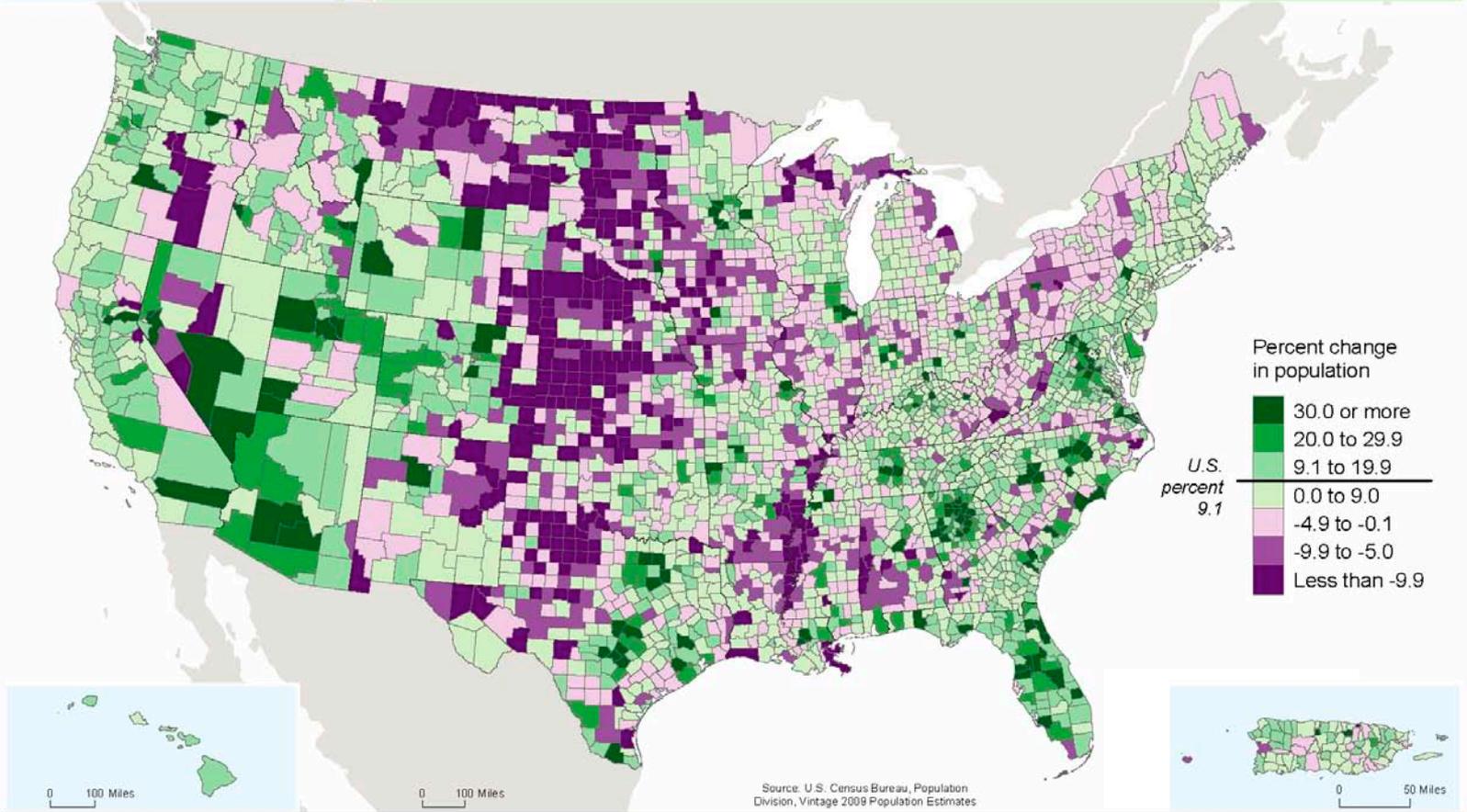
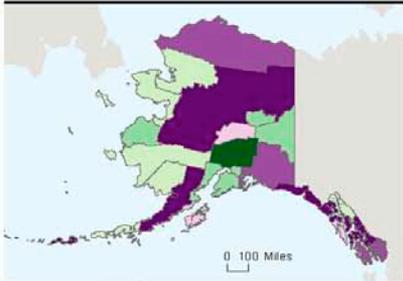


Change Maps

- **Rather than showing multiple maps for different times, calculate the change and display it directly**
- **Can show absolute or percentage change**
- **Good candidates for diverging color schemes**

Change Maps

Percent Change in Population for Counties and Puerto Rico Municipios: April 1, 2000 to July 1, 2009



- **Show a variable of interest with proportional symbols**
- **Provide extra context with a choropleth map in the background**
- **Choose scales carefully – proportional symbols can obscure small areas**
- **Choose colors carefully**

US Ethanol Facilities by Capacity

