

Choropleth Map

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This document is intended as a brief introduction.

Choropleth maps are a type of thematic map in which areas are colored or shaded to reflect the value of the mapped phenomenon or to display classes of values. The word choropleth is derived from Greek: *choros* (place) and *pleth* (value). Most people have seen choropleth maps (think of election night and the evening news), but few people know them by this name. Choropleth maps can be especially useful for making comparisons between maps (time series for the same variable or two separate variables) and when viewing data in geospatial relationships (e.g., adjacency or spatial autocorrelation). Briefly, the three main characteristics of choropleth maps are as follows: they are used to display quantitative and qualitative areal variables; observations are classified into classes; and, each class is assigned an areal symbol/color.

How to Classify

To design an effective choropleth map careful decisions about color selection are needed (See “Color Selection” Resource Document http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-45.pdf). If **nominal scale** data are employed, ungraded patterns or colors could be used, i.e. patterns or colors having equal visual weight, since we are only interested in being able to distinguish between different classes. If the data are in **ordinal**, **interval** or **ratio scale**, then graded series of colors or patterns should be considered. If a larger number of classes are required, we could use shades of two colors to show classes that are above or below average.

The **number of classes** is determined by the researcher/designer. The number of classes should depend in part on the number of observations – i.e., with more observations users may decide on a larger number of classes. However, typically maps are designed with four to six classes, and very rarely do they include 10+ classes. This is because too many classes can make the map more difficult to interpret. Conversely, too few classes tend to emphasize broad regional patterns and some detail can be lost (Campbell, 2001). The classification scheme should be chosen to accurately represent the distribution of data values and to show spatial variation within the study area.

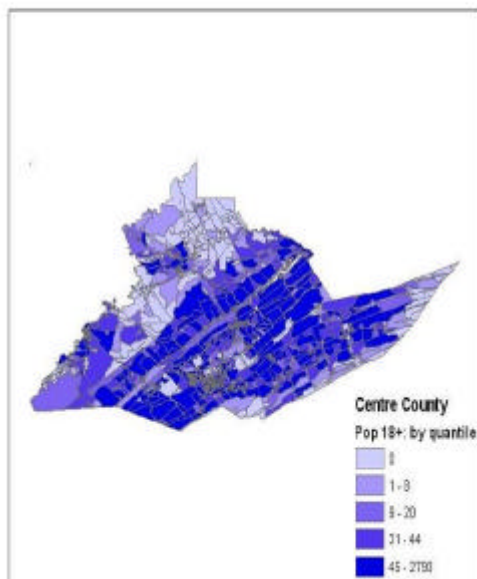
Another important consideration in creating a choropleth map is the choice of **classification scheme** to be used. With nominal and ordinal scale data, researchers generally are given a set of classes. However, with interval and ratio scale data, people must group the observations into classes first. The chosen classification scheme can have a major impact on the visual impression created by the map (Campbell, 2001; Tyner, 1992). Therefore, users should focus on classifying the data in a way that (a) reveals whatever spatial variation exists within areas and (b) minimizes the potential for misinterpretation of the map. Five classification methods are typically available within a standard GIS: equal interval classes, nested means, quartiles, skewed distributions and

natural breaks. Usually, a classification scheme is selected after examining the range and distribution of the data (Tyner, 1992).

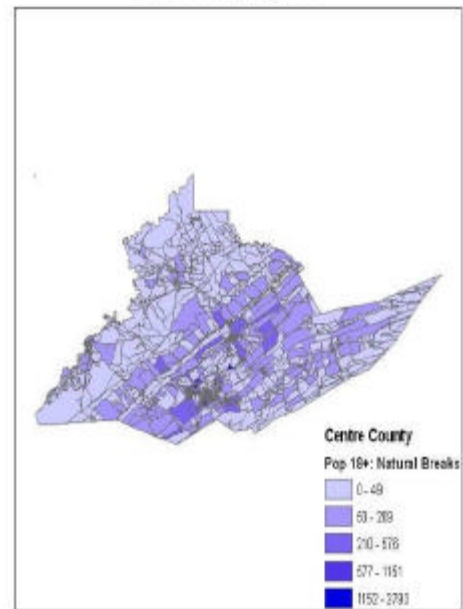
Examples:

Two choropleth maps which exhibit population over age 18, Centre County, PA*

Population Over Age 18: Classified by Quantile
Centre County, PA



Population Over Age 18: Classified by Natural Breaks
Centre County, PA



Reference and Further Readings

1. Campbell, John, 2001, *Map Use and Analysis*, Boston : McGraw-Hill.
2. Slocum, A. Terry. 2005, *Thematic cartography and geographic visualization*, Upper Saddle River, NJ : Pearson/Prentice Hall.
3. Slocum, A. Terry. 1993, *Comparison of Methods for Learning Choropleth Maps [1988-1990: United States]*, Ann Arbor, Mich.: Inter-University Consortium for Political and Social Research.
4. Tyner, Judith, 1992, *Introduction to Thematic Cartography*, Englewood Cliffs, N.J. : Prentice Hall.

* Maps are created by GIA Core.