



Visualization of a USDA Economic Research Service Survey

Mapping Organic Manufacturers, Processors, and Distributors

An Exercise in Point Cartography



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Introduction

Cartographic design has always presented unique challenges to geographers and cartographers. It is difficult to include all necessary data and still make the map useful. If the map contains too much information it often becomes cluttered or noisy. If the map does not contain enough information the message that is trying to be conveyed becomes vague. The overall goal is to produce a map that conveys the proper information in a format that is legible and concise. If done properly, a person with little to no background knowledge on the subject will be able to pick up a map and understand what information is being communicated. Some datasets are very conducive to cartographic design while others are not. The dataset used for this project consists of point data at the national scale, presenting a prime case of a dataset that can be difficult to visualize.

Methodology

The data for this project came from a 2004 nationwide survey of organic manufacturers, processors, and distributors provided by the USDA Economic Research Service. It consisted of 59 questions in 8 categories. In addition to the survey a database file was provided containing the results to the survey. Results were not provided for all of the questions only the ones of primary concern. Questions of primary concern were numbers eight, fourteen, fifteen, twenty-four, fifty-five, and fifty-six. The spatial data were not included with this dataset, so geocoding based on the zip code was necessary. This database file was geocoded using ArcMap 9.2 producing a point at the centroid of each zip code containing a firm. This produced 1,393 points across the U.S. that were ready for analysis and processing into proper maps containing all necessary cartographic elements. The challenge was to then make maps that illustrate some of the difficulties of point cartography.

Limitations

Displaying almost 1,400 points on a map at the nation scale of the U.S. presents certain challenges. When dealing with that many points it is easy for the data to become noisy. The problem is only complicated when trying to display different attributes of the data, which often produces cluttered maps. A good cartographer will use their ability to extract the useful information while leaving everything else. It is also important to choose a symbology that is conducive to the information that is being displayed. The symbology used will depend on the dataset and its attributes. Due to the private nature of this data Alaska and Hawaii were left off of the maps, it is too easy to identify the firm from each zip code at the regional scale of a state.

Results

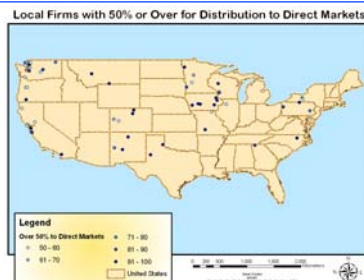


Figure 1- Using graduated colors and normal sized points allows the map reader to identify the location and attribute of each point. Compare to figure 2.



Figure 2- Using colors that do not blend well in combination with graduated symbols makes it hard to discern the point location and attributes. Compare to figure 1.



Figure 3- While the point density makes it hard to discern point location, it is still possible to identify the different classes. Compare to figure 4.



Figure 4- The graduated symbols make it impossible to discern point location because of the overlapping and the color scheme makes it difficult to tell the classes apart. Compare to figure 3.



Figure 5- The color scheme here makes it possible to identify clusters of like classes by just looking for darker or lighter colors. Compare to figure 6.



Figure 6- This graduated color scheme is in no way conducive to the identification of clusters, the different colors are too distracting to the eye to discern any patterns. Compare to figure 5.



Figure 7- This map illustrates how representing one attribute of the data keeps the map simple and less cluttered. A less complex map with less information and noise is often easier to read, therefore making it easier to convey information.

Conclusions

Cartography often presents many challenges to a geographer. One must find a balance between the amount of information and the accuracy of the information to create a suitable map. If this balance is not achieved the produced map will often end up cluttered or noisy. This dataset gave me an ideal opportunity to try to find the balance between accuracy and content. To visually represent a large dataset of points requires the ability to decide what information is most pertinent. In addition, it is important to understand symbology and the integral role that it plays in cartography. Proper symbols can make the difference between good and bad maps.

References

Board, C. and Taylor R.M. 1977. Perception and Maps: Human Factors in Map Design and Interpretation. *Contemporary Cartography* 2(1): 19-36.

Acknowledgements

I would like to thank Dr. Duram for her help in retrieving the dataset and her guidance on the project. I would also like to thank Dr. Carolyn Dimitri and Dr. Lydia Oberholtzer from the USDA ERS for the dataset and their ideas for this project.