

## Maps of Jackson, Mississippi

**Sandra Lach Arlinghaus**

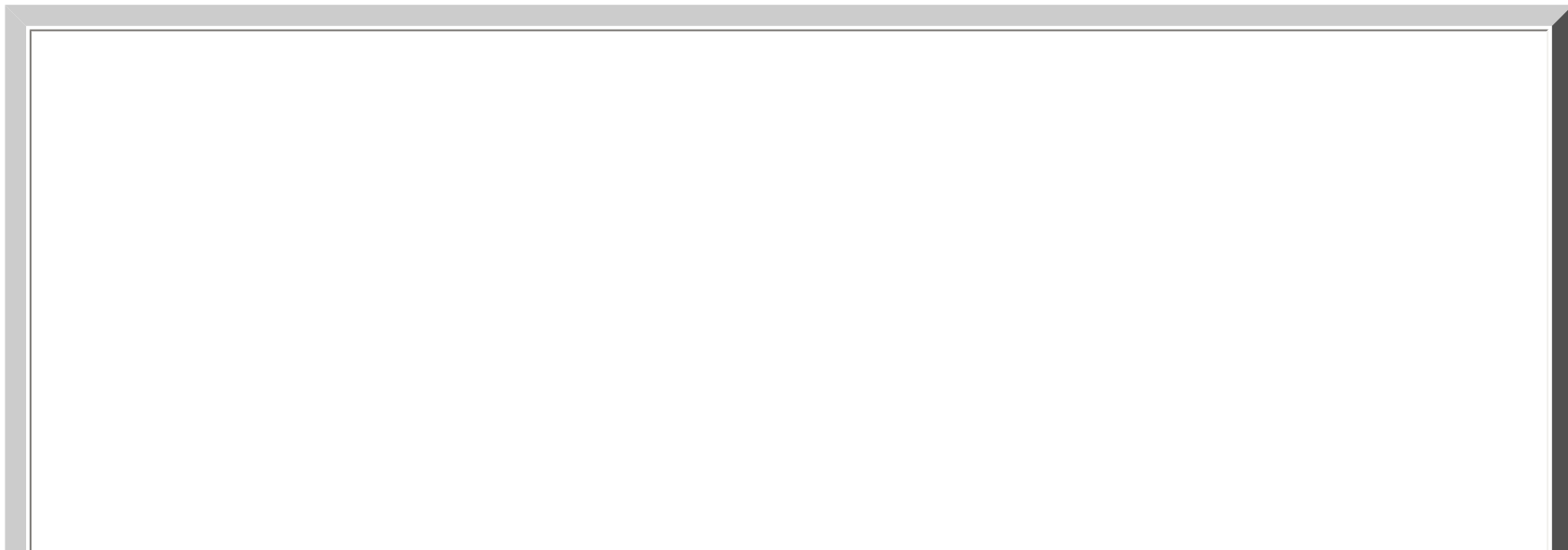
University of Michigan, School of Natural Resources and Environment  
Community Systems Foundation  
Institute of Mathematical Geography

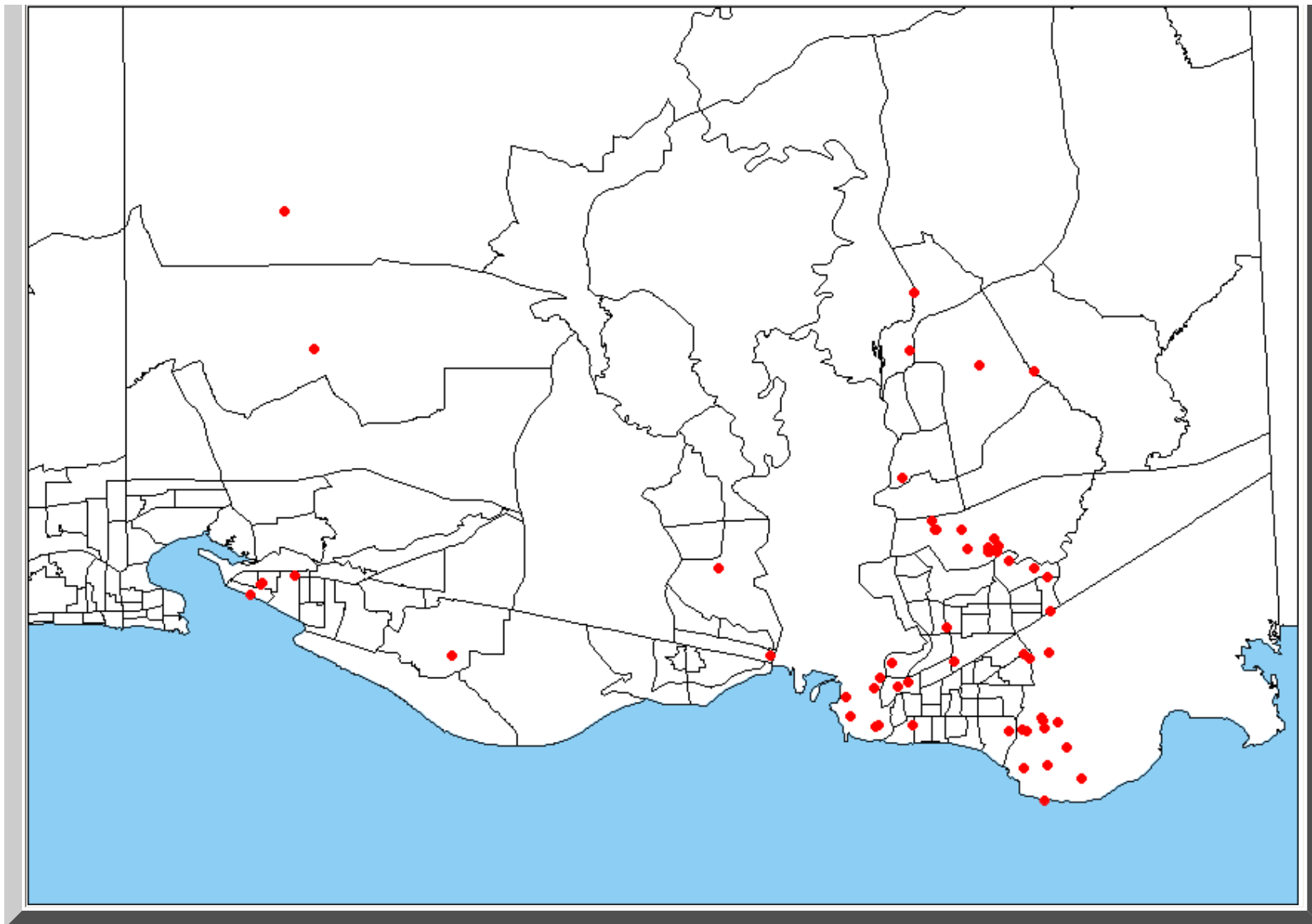
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The [Environmental Protection Agency](#) (EPA) maintains an online mapping facility, called Landview III, that contains [data and site locations for hazardous sites of various sorts](#), as well as selected Census, United States Geological Survey, and other, data and boundary files. The user visits the EPA site and is permitted to download, free, the Landview software and one county boundary file and one county data file (per transmission). For those, such as precollegiate teachers, this is a marvelous resource for gaining some mini-GIS mapping capability. For those with full GISs on their desks, Landview also serves as a fine source of location and data files. The data files come in .dbf format and many already contain positional information as decimal degrees of latitude and longitude. Thus the files map easily in, for example, ArcView 3.2 (Environmental Systems Research Institute--ESRI). Simply open the table of interest and open that as an Event Theme which can then be converted to a shape file. The maps below offer an example of this capability. In addition to Landview III, other software packages used were: ArcView 3.2 (ESRI), Spatial Analyst Extension (ESRI), 3D Analyst Extension (ESRI), Animal Movement Extension to ArcView (free), Adobe PhotoShop 5.5, Netscape Communicator 4.05, and MS Excel (Microsoft Office 97, Professional version) Windows 98 (Microsoft).

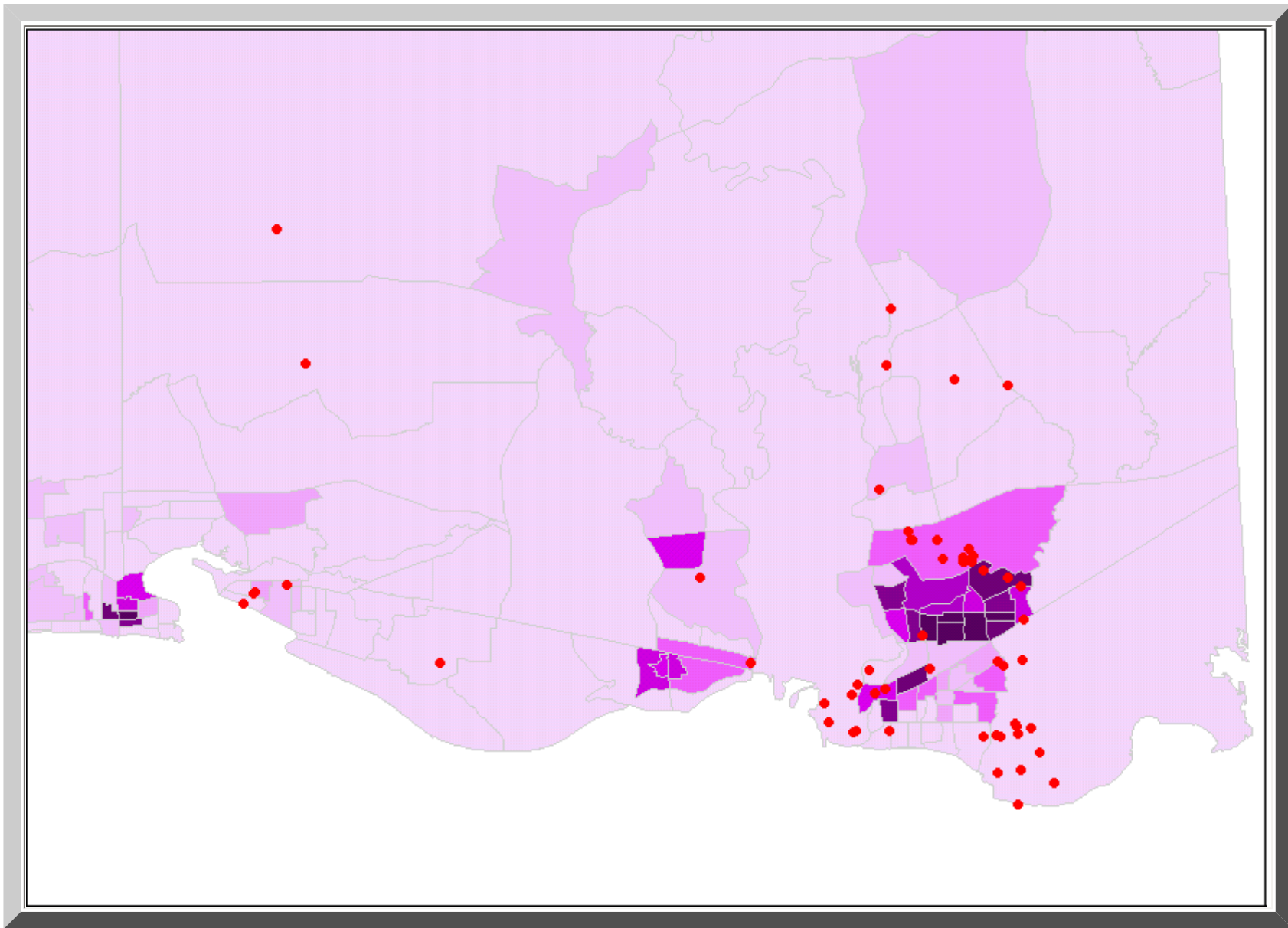
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**Map 1.** In this map, all the EPA sites noted in the database (mapped as red dots) are treated equally. The files for [each individual database](#) were merged using the Geoprocessing Wizard extension in ArcView. The polygons are Census blockgroups. North is at the top of the map. The boundary on the east is the state line separating Mississippi from Alabama. Mobile, Alabama is just to the east. The Gulf of Mexico is to the south; Jackson is a coastal city.

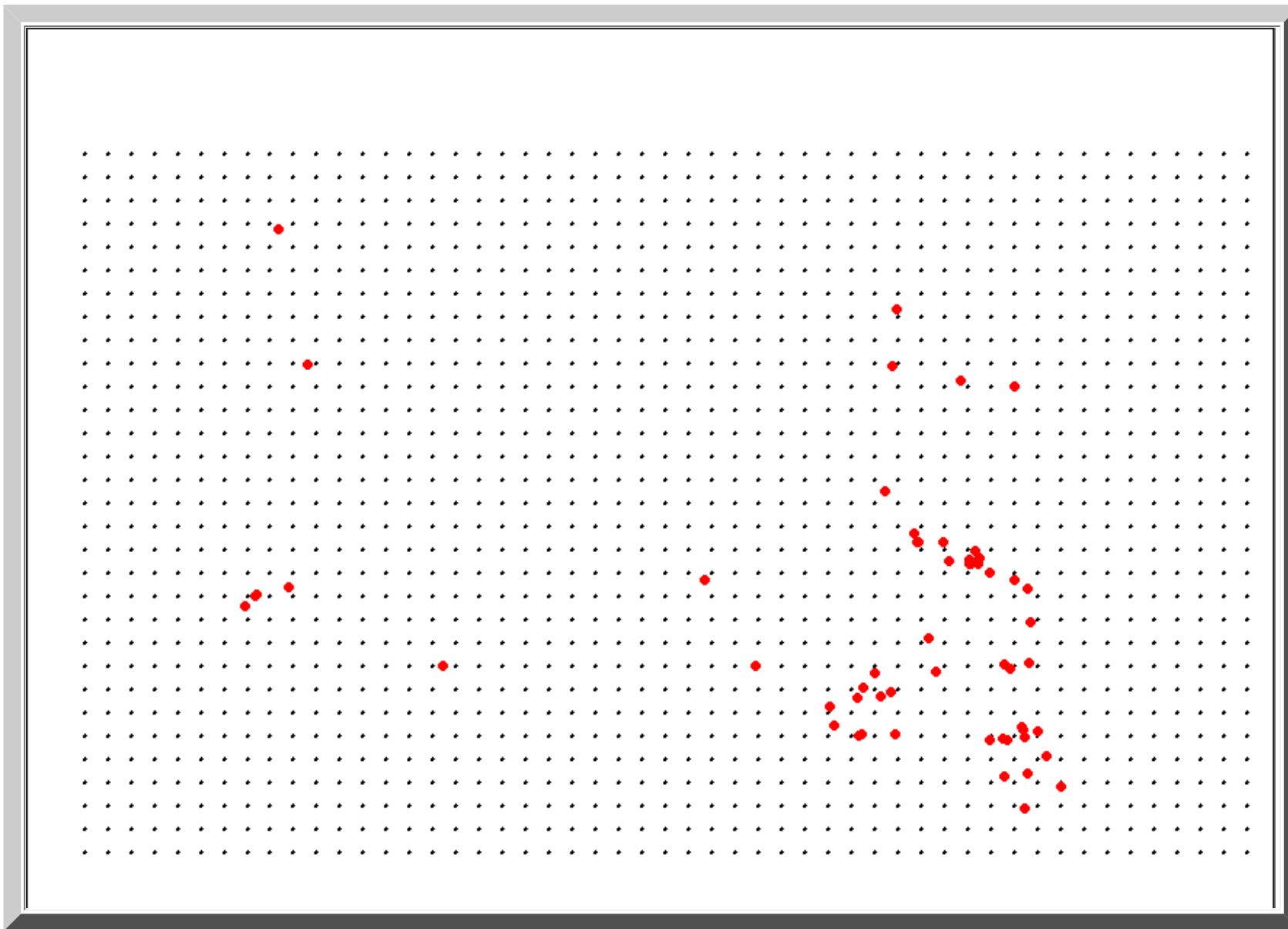




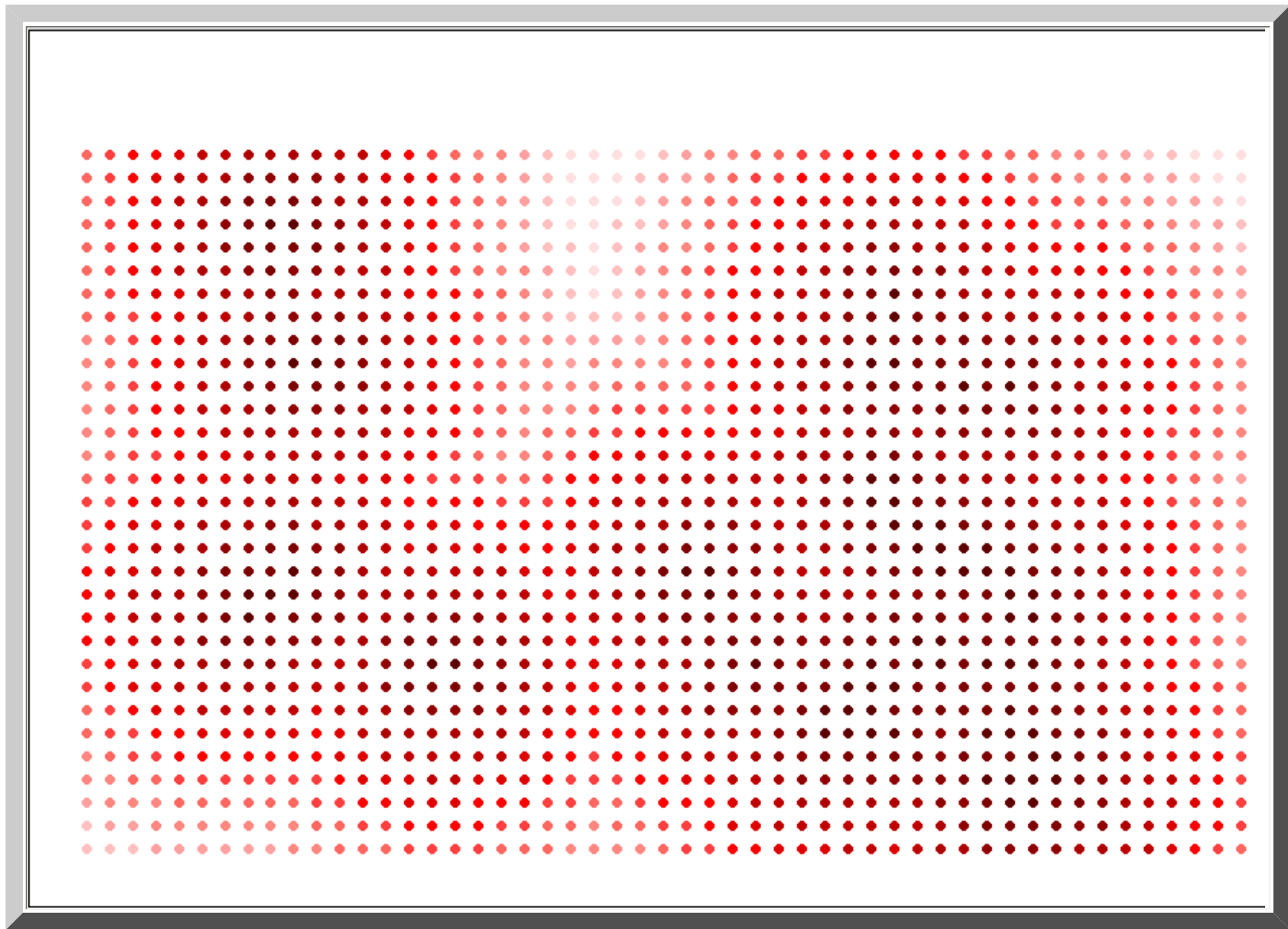
**Map 2.** A natural next step in the mapping process might be to create a thematic map using Census data for the blockgroups. One might consider demographics of various sorts in relation to EPA site location. The map below shows the blockgroup polygons colored by racial categories of "black" or African-American population and "white" or Caucasian-American population normalized by 1990 total population for each blockgroup. Deeper shades of purple indicate higher densities of African-American population. One direction that further mapping effort might take is to overlay other boundary files, such as rivers, and also to create more thematic maps based on other demographic, economic, and physical variables. The remaining maps suggest another approach.



**Map 3.** The blockgroup boundaries were removed. A grid of points, spaced at 0.01 degrees of latitude and longitude was superimposed on the map. The grid database was created in Excel and brought into ArcView as an Event Theme.

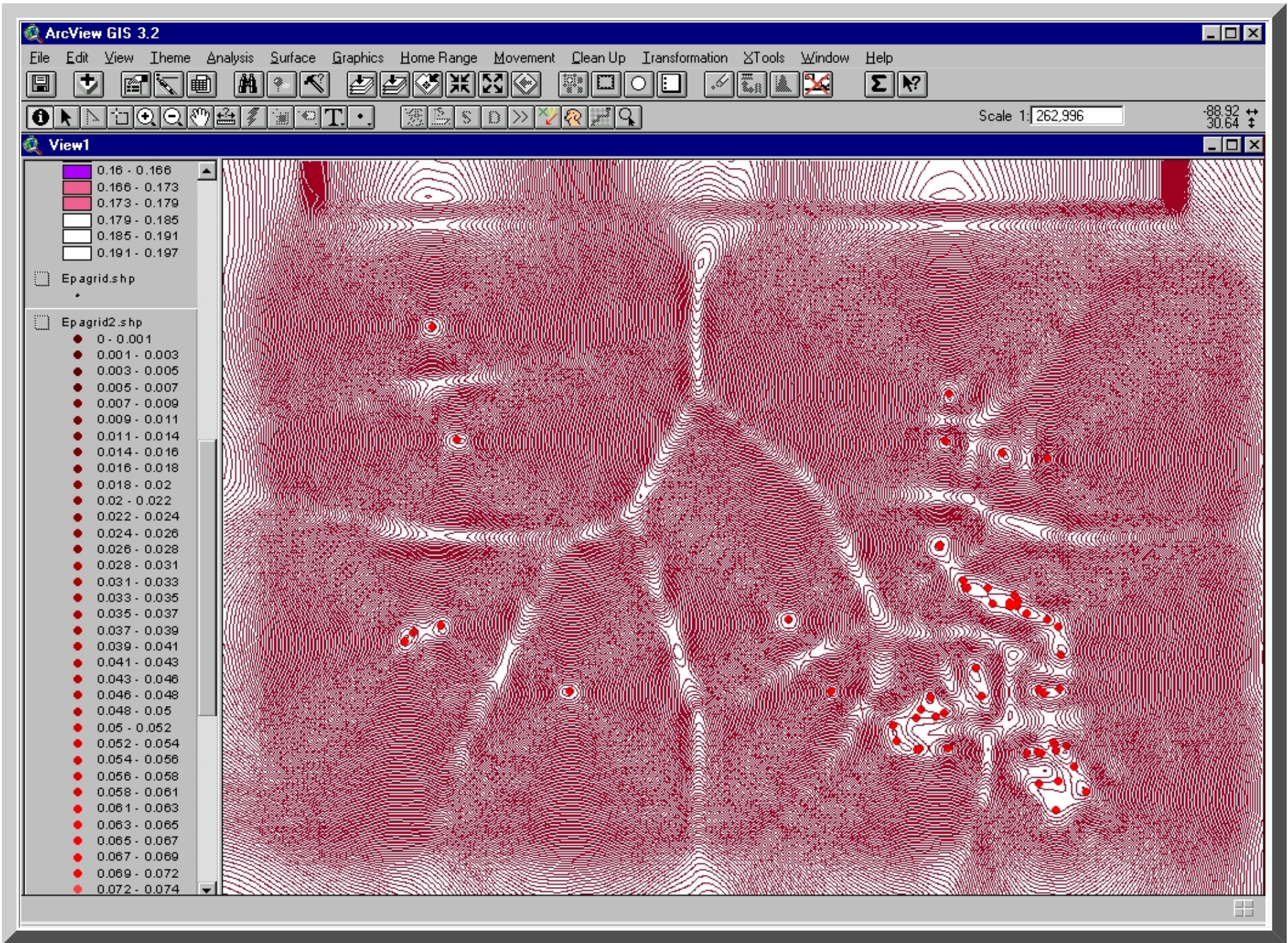


**Map 4.** The grid points were assigned weights based on distance from EPA sites. Those points closest were colored with the darkest shade of red; those farthest away with the lightest shade. The distances were calculated in Animal Movement Extension (Hooge and Eichenlaub, 1997), Movement|Calculate Distance, with distances measured from EPA sites to grid points. These distances were then used as weights and the grid points (as a shape file) were shaded using a standard color ramp. Weights might be assigned using any of a number of standard weighting techniques or using technique designed by the cartographer or other map creator (Tobler and Wineberg, c.1975 is one classic example).



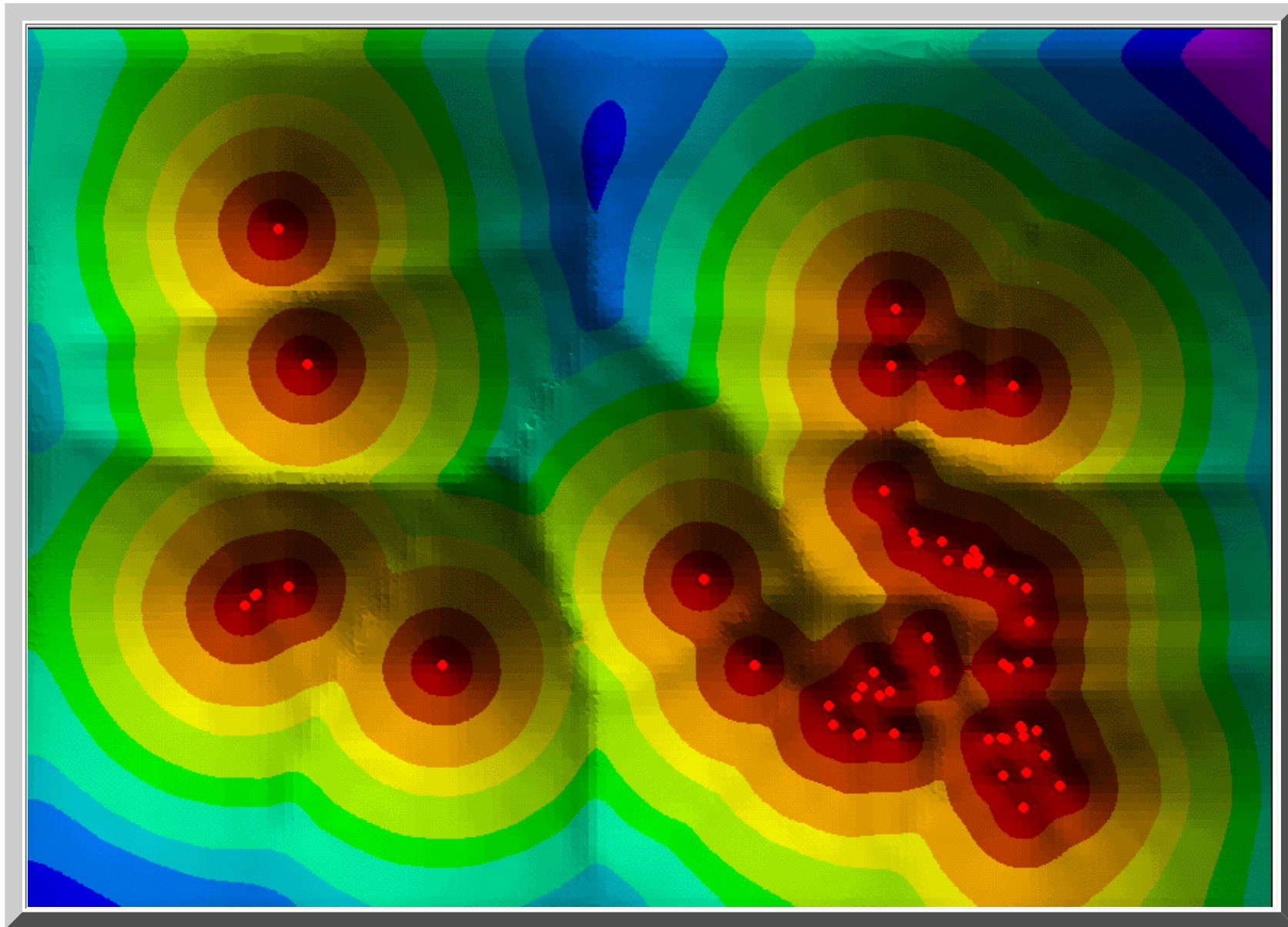
**Map 5.** The grid points were then finely contoured, in 0.001 parts of a unit. The Surface|Create Contours command was employed. The method of interpolation chosen was Spline, the Z-value used was the distance value calculated above, and the type of contour selected was a tension contour. Here the screen capture is placed directly from ArcView into the html file. Note the apparent swale lines and saddle points in the contouring representing troughs based on the distance data and peaks or flat surface surrounding the actual sites.







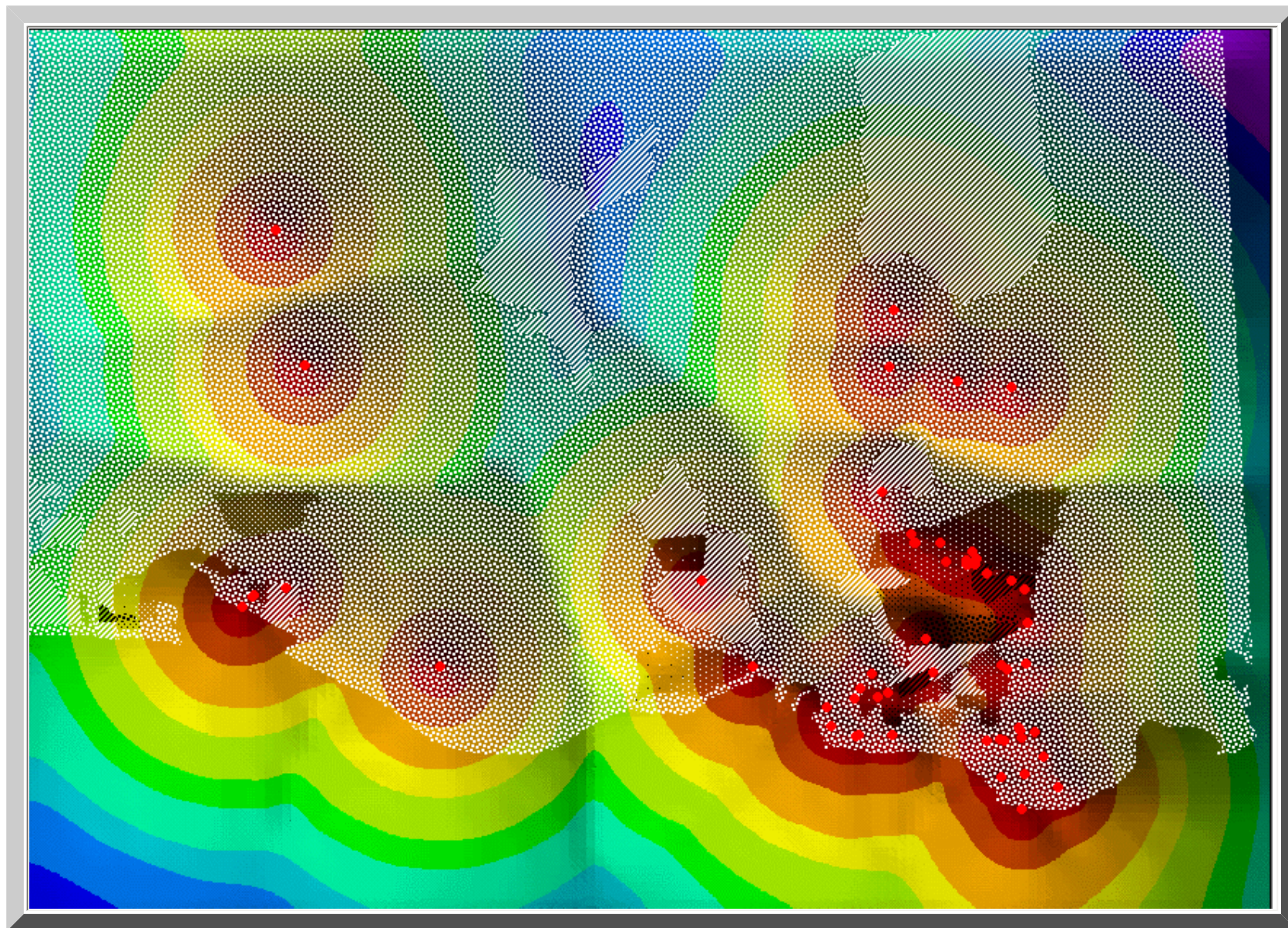
**Map 6.** The contours were then converted to a Triangulated Irregular Network (TIN) (Arlinghaus et al., 1994) to suggest a surface based on distance from EPA sites. Warm colors represent locations close to numerous EPA sites; cool colors represent locations farthest from EPA sites. Shading, coupled with the use of a finely-contoured surface, make the peaks and valleys stand out. The TIN is calculated by the software; basically, it triangulates the contours creating tiny triangular facets, which when colored and shaded, suggest a surface.



**Map 7.** The TIN is then covered with the thematic map shown in Map 2. Here, once again, the demographic data is



calculated by block group: percent "black" and percent "white". Denser patterns of black and white represent greater block group densities of African-American and Caucasian-American populations. The block group boundaries were colored transparent as were the backgrounds behind the patterns so that the TIN would show through. To preserve the invisible background outside of ArcView, the Windows-universal screen capture, Alt+PrintScreen, was used to put a copy of the screen image on the Windows Clipboard. The clipboard was then pasted (Ctrl+v) into a blank canvas (File|New) in Adobe PhotoShop (which senses the size of the Clipboard image on opening a new blank canvas) where the image was cropped.





The evidence of maps can communicate information differently to different people. As mapping software becomes easier and easier to use, one can only hope that curricular matters keep pace. Maps like these in the hands of a policy maker can be helpful or dangerous weapons; fine geographic education can make them become the former.

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## References.

Arlinghaus, S. Austin, R., Arlinghaus, W., Drake, W., and Nystuen, J. Practical Handbook of Digital Mapping Terms and Concepts. CRC Press. 1994.

Hooge, P. N. and B. Eichenlaub. 1997. Animal movement extension to ArcView. ver. 1.1 and later. Alaska Biological Science Center, U.S. Geological Survey, Anchorage, AK, USA.

Tobler, W. R. and Wineberg, S. c.1975. A Cappadocian speculation. *Nature*.

