

The Dance Hall Goes in What School District?

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Abstract

This paper presents the results of a GIS mapping effort created for the Delaware State Department of Education using ArcGIS and ArcReader. The primary objective was to create a set of maps showing public schools by each of 19 school districts. The secondary objective was to create a GIS file of the school district boundaries. While the mapping task proved straightforward, the district boundary task presented many problems as one tried to use a GIS to create lines from descriptions written thirty years ago. The result was a proposed new technique for creating district boundaries using digital data and a GIS.

Introduction

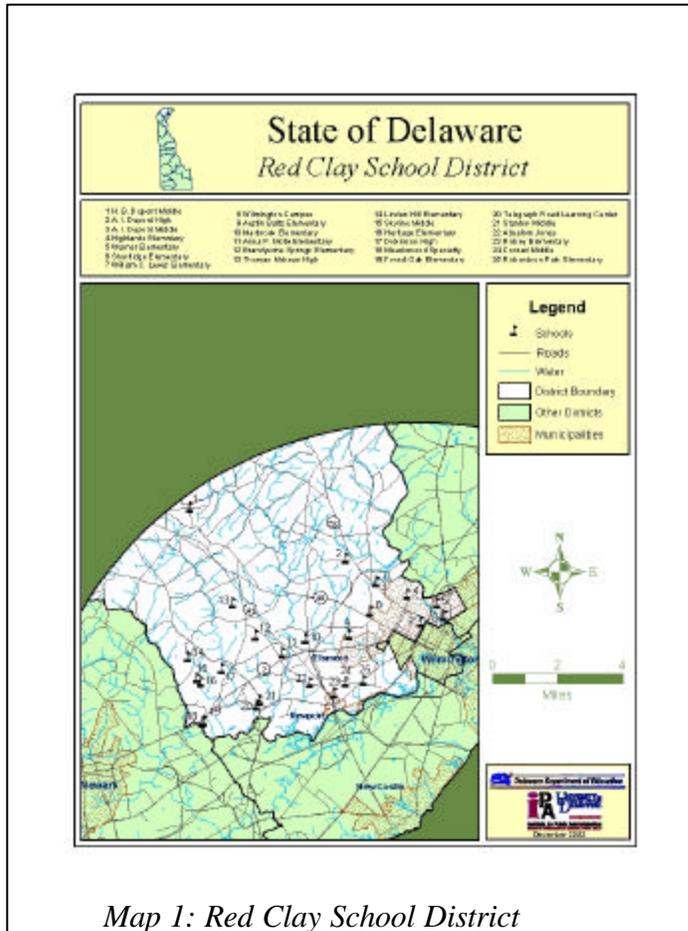
The State of Delaware Department of Education had last updated their statewide school district boundary descriptions and maps in 1974. Major boundary changes had occurred since then, and they wished to complete an update. The University of Delaware Institute for Public Administration undertook the task and proposed that a Geographic Information System (GIS) be used to create the boundary lines. This request was agreed to, and it was decided also to include the creation of a file of public school locations along with a file of school district boundaries. This project could then serve as a base for further development of an educational administrative GIS.

The final product consisted of a point shapefile of the individual school locations with basic attribute data such as name and district; a shapefile of the school districts; and a set of twenty-one maps, including two statewide (Public School Districts and Vocational technical School Districts) and nineteen of the individual school districts with the schools located on them (e.g. Map 1.).

In 1974 Roger Mowrey, Administrative Assistant to State Superintendent of Public Instruction, published a document titled, "Delaware School District Organization and Boundaries." In his words it was "an attempt to bring together under one cover the disparate sections of law, records and minutes detailing boundary decisions and school district unions, consolidations, divisions, and incorporations." It became the source for school boundary information and has been referenced for information for 29 years.

In 1974 Delaware's educational community consisted of 23 school districts. In 1976, and subsequently in 1978, the Court ordered the desegregation of the original school districts in New Castle County. The Court mandated that the 10 suburban school districts and the

then separate Wilmington school district be reorganized into 4 areas operating under a single superintendent.



In 1981 The General Assembly passed legislation authorizing the Delaware State Board of Education to ensure compliance with the 1978 Order. The State Board proposed the abolishment of the four districts under one superintendent and the establishment of four separate school districts. The Wilmington district would no longer exist and its area would be apportioned among the four newly formed districts. Each would serve a portion of Wilmington. Thus, in 1981 Delaware’s educational community consisted of 16 school districts with four New Castle County districts greatly modified.

The current Delaware educational community consists of 19 independent school districts: These include the 16 referred to above and 3 vocational school districts whose boundaries coincide with those of the three counties.

School Locations by School District

One thing that Mowrey did not provide in his work was the actual locations of the schools. In order to add these data to the maps, we obtained the addresses from the Department of Education web sites supplemented by information from the individual schools' web sites. To create the school shapefile, we used existing parcel line data and current orthophotography in order to determine their geographic location. The location of each school is represented by a symbol on each district map. See Map 1 for an example.

Important throughout this project was the fact that we were not only creating maps of school locations but also creating a database for use in a GIS. All school points on the map have geographic coordinates. Using a GIS, if one zooms in on a school symbol with an orthophoto (georeferenced aerial photo) as a background, one would find that the school symbol is centered on the actual location of the school in geographic space. For each point (school) on the map, there is a database entry. The database contains the school name, school type (Elementary, Middle, Special, etc.), school district, and county. Additional data can easily be added to this file, or the file can be linked to other files containing other school information. The data can then be mapped or used in future analyses.

School District Boundaries

The drawing of the district boundaries presented us with a more difficult problem. Because we had at our disposal technological tools not available in 1974, we decided to use them to completely revise district boundary maps using GIS and other computer graphics techniques. School redistricting that occurred in New Castle County post-1974, resulted not only in new district boundaries but also in new districts. These changes could not, at that time, be portrayed with the accuracy now possible with a geographic information system. An additional benefit of using a GIS is that future changes can be made easily so that district boundaries and school locations can be investigated, added, modified or deleted, and new maps can be produced quickly.

Mowrey's work includes machine copies of maps taken from different sources. The maps are at different scales, and the district boundaries were created by drawing them on the paper maps, cutting out the districts, and then making copies of the cutouts. The original district boundary descriptions, most of which were written in 1974, required modification for this project because today, they are often found to be confusing and ambiguous.

For example, the line between the Cape Henlopen - Milford school districts would become difficult to locate if the properties change hands:

Beginning on Route 238 where Gravelly Branch crosses the road, the junction of Cape Henlopen, Indian River and Milford;
by Gravelly Branch north to a point which lies south 82° west from the corners of the properties of Walter J. Fisher, Elizabeth and Mary Houston, and Florence McKenney on Route 240;

It would present further complications if the dance hall referred to in the Cape Henlopen – Indian River boundary description is converted to another use:

Beginning at the Indian River Inlet, the junction of Cape Henlopen and Indian River;
by Indian River Bay and Rehoboth Bay by a line west of Burton and Bush Islands to the mouth of Herring Creek;
by Herring Creek, the south branch of Herring Creek and Unity Branch to Route 301 about 3/10 mile east of its intersection with Route 302;
by a direct line southwest to a point on Route 5 about 2/10 mile southeast of its intersection with Route 307;
by a direct line southwest to Route 305 about 2/10 mile north of its intersection with Route 306, *the dance hall property being located in Cape Henlopen*;

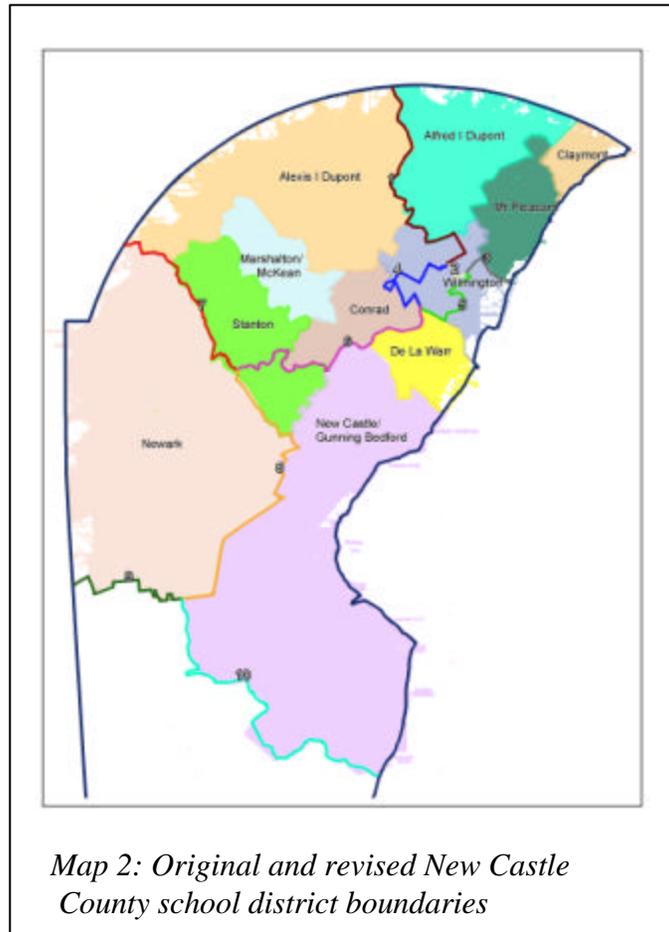
This problem becomes readily apparent when one tries to reconcile the narrative description with what is actually seen when one looks at property parcel lines or the physical environment as seen on an orthophoto. The problem also arises when requests are made of county planning departments to clarify whether or not a parcel is in a certain district.

To create boundary lines in a format usable in a GIS, two sources were used. The first was the boundary descriptions found in Mowrey with any additional information provided by the individual school district. This process, while not completely accurate, sufficed for the districts outside New Castle County since they had been the least affected since 1974. However, this method was not entirely satisfactory for creating the boundaries of the Red Clay, Brandywine, Christina, and Colonial Districts in New Castle County.

In Map 2, the color-filled polygons represent the original districts, and the lines enclose the resultant four polygons (districts) formed by splitting up the original districts. While there were written descriptions of the boundaries, there were no good maps showing these changes.

Map 2 was created by scanning the original district maps from Mowrey, (machine copies of maps at various scales); georeferencing these images as one would a CAD drawing, and using ArcGIS to create the lines that enclose the four newly-formed districts. The lines are colored because the format for describing school district boundaries is to describe the line between districts and not the entire polygon enclosing the district. Our second source was the census digital boundary file. This file had been created at a much smaller scale and required extensive editing, but it was a good guide to the districts that had not experienced redistricting. With much appreciated assistance from the Data Service Center (DSC) in New Castle County, the census line data was edited on-screen, and the boundaries were realigned to more accurately represent their intended location. On-screen background references for the line realignment were the orthophotos and New Castle County digital parcel line data. While the maps created for this project and

included in this report are at too small a scale for modifications to be noticed, they would become much more evident if they were viewed at a much larger scale in a GIS.



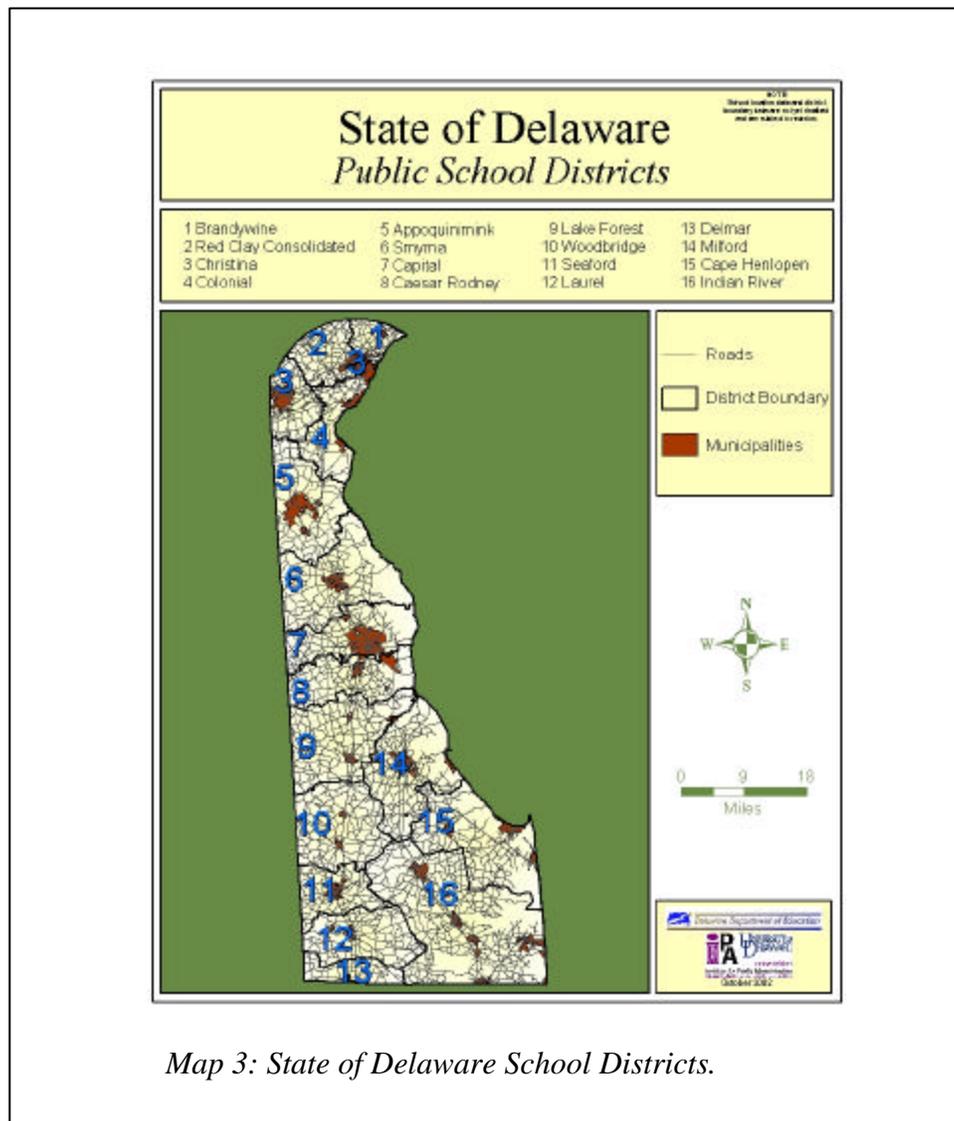
Line revisions included such things as moving a boundary from land area to the center of a stream, or moving a boundary that crossed the center of a block rather than following a street centerline, or modifying a boundary that passed through what was then open land and is now a housing development. However, these boundaries still require refining in that the district boundary lines are most often the same line as the parcel lines on the perimeter of the districts. Each parcel of land is in a particular school district and that district must be identified in the assessment file for tax purposes. Current GIS technology allows us to accurately draw these lines. For this project, the best available data were used to determine where the line should be. See Map 3 for an example of the final statewide district map.

In order to establish the most accurate set of district boundaries, a second phase to this project should be pursued. This phase would use the parcel line data in GIS format to form the boundary for the districts. The process would consist of overlaying the district boundary maps with parcel data issued by each county. Since each parcel must be in a

school district for tax purposes, district lines would then be relocated to the parcel lines to establish a district boundary.

Correlating the parcel data with district maps will eliminate the location of district boundaries passing through individual properties, farms or bodies of water as we have seen in the past.

Map 4 shows a rough draft map colored not by school district boundaries but by color-coding each property parcel by the school district of that parcel. Once each parcel was coded correctly, each county could maintain that information in its assessment file. The extension of the Appoquinimink School District (aqua color) into the Colonial School District is caused by the fact that that is one polygon extending along the banks of Chesapeake and Delaware Canal. The black district boundary lines are the boundaries as revised for this project.

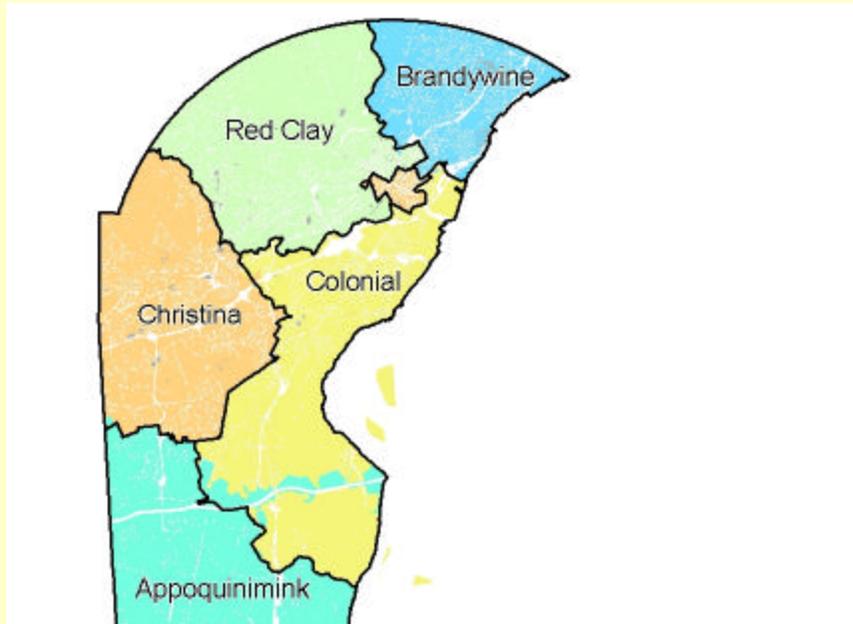


Map 3: State of Delaware School Districts.

Once the second phase is completed, anyone using a GIS would have the ability to select those parcels of land by school district code, effectively drawing a school district boundary without using a polygon boundary. In essence, parcel data coded with school district code would eliminate the need for a written description of district boundaries.

Thus the recommended path forward is to:

1. Use GIS data to create new district boundary maps using parcel boundary line data
2. Create an update / monitoring procedure for these data.
3. Meet with district representatives to agree upon each dividing line.
4. Modify attribute data in the assessment files, if necessary.
5. Take necessary legislative action to create boundary descriptions.



Map 4: Parcels color-coded by school district.

References

Mowrey, Roger C. 1974. *Delaware School District Organization and Boundaries*.

Delaware School District Organization & Boundaries: Closing the Gap. 2003. Newark, DE: Unpublished document by the University of Delaware Institute for Public Administration and The Delaware Department of Education.

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