

GIS Analysis to Write a Comprehensive County Farmland Preservation Plan

Authors

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Abstract

The Cumberland County Comprehensive Farmland Preservation Plan guides the county's efforts to preserve viable farmland and enhance its agricultural industry. The plan recognizes farming as a major component of the county's economy based on an irreplaceable natural resource. Using ArcGIS and the ArcGIS Spatial Analyst extension to create a simple map from complex data, the county can easily identify and target the most productive farm areas for preservation efforts.

Introduction

New Jersey is a state of polarities, having some of the highest population densities in the country, while at the same time, having some of the most pristine wilderness, such as the Pine Barrens and the Delaware Bay Watershed region. Within this diverse landscape is the very fertile and productive farmland that enables the Garden State to live up to its name.

The goal of the Cumberland County Comprehensive Farmland Preservation Plan is to guide Cumberland County's efforts in preserving its remaining viable farmland and enhance its agricultural industry. The plan recognizes that farming is a major component of the county's economy and that farmland is an irreplaceable natural resource.

The State of New Jersey, with the increase of development pressures being felt from the New York Metro Area, Wilmington, Philadelphia and Atlantic City, established the New Jersey Farmland Preservation Program in 1984. This program allows area farmers to voluntarily sell the development rights of their property resulting in permanent preservation of their farmland. Since its inception, Cumberland County's farmland preservation program has been successful in preserving over 10,000 acres through this easement purchase program.



Recently, the State Agricultural Development Committee (SADC) began encouraging all participating counties to adopt a comprehensive county-wide Farm Plan. In order to begin, Cumberland County had to first reevaluate the previously adopted Agricultural Development Areas or ADA. An ADA is an area identified by the County Agricultural Development Board and certified by the SADC where agriculture will be presumed the first priority use of the land and where certain financial, administrative and regulatory benefits will be made available to those landowners who chose to participate. It was determined that the analytical capabilities of GIS would provide the means to compile multiple layers of information and create one simple to use and updated ADA.

The Model

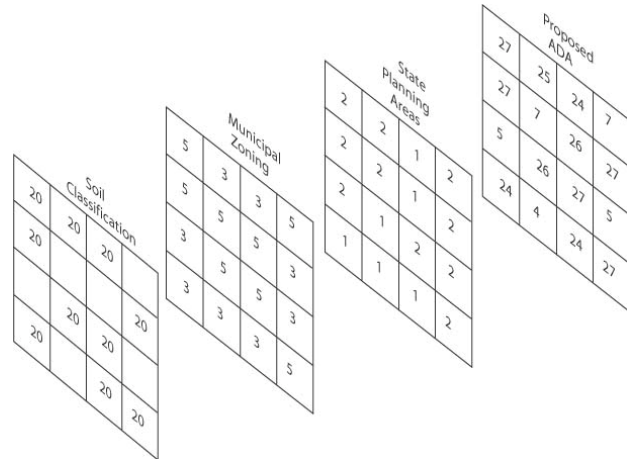
When evaluating an applicant to the Farmland Preservation Program there are several key factors to consider. The soils of the property, what State Planning Area the property falls in, the proximity to other preserved and or identified farmland and the local zoning ordinances.

Ultimately, the resulting map for the GIS analysis will be a simple to read visual for where the above criteria overlap. It was determined that for the reanalysis of the ADA, in order to be considered a primary priority, the property must be prime or statewide soils, as identified by the Natural Resources Conservation Service of the USDA, and within State Planning Areas 4 or 4B, identified as rural or rural with environmental sensitivity. In addition, it must fall within an agricultural zoning area. In order to be identified as a secondary priority, the property must be prime or state soils and fall within State Planning Areas 3, Fringe Area or 5, Environmentally Sensitive.. All other previously identified farmland is considered a tertiary priority.



The Method

Using Spatial Analyst for ArcGIS8.1, the soils data, identified farmland, and the state planning areas were converted to grid format. The next step was to recalculate the values of each criteria. All identified farmland was assigned a value of five (5); Prime and State Soils were assigned values of four (4) and three (3), respectively; State Planning Areas 4/4B were assigned values of two (2), while Areas 3 and 5 were assigned a value of zero(0). Next, using the map algebra wizard the three individual maps were “added” together to produce the Prioritized Farmland Layer. The values assigned to each individual layer were intended to produce a unique value for each combination of layers. The higher the value the cell added up to, the higher the priority value assigned.



In order to account for zoning variances within each municipality, the primary areas again reassigned a value of one (1), while secondary areas were assigned a values of two (2). In addition, agricultural areas were assigned a value of ten (10). Again, using the map algebra wizard within Spatial Analyst the resulting maps were “added” together to create unique values to determine where the primary areas intersected with agricultural zoning areas.

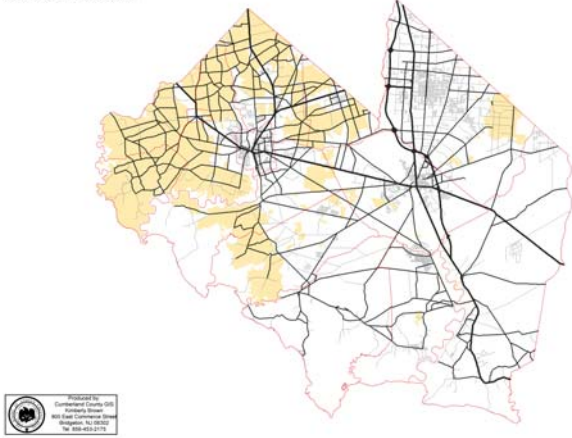
Future Considerations

As the data continues to be refined, it is expected that this process will need to be reassessed again. For example, since the reanalysis of the ADA, the USDA has certified the SSURGO soil data layer, which is an updated version of the soil layer, that was last evaluated in 1978. Furthermore, by the end of 2005, the county will take delivery of a seamless county-wide parcel data layer. This data layer will identify all parcels that currently qualify for farmland assessment for tax purposes and provide the county GIS staff the first set of means since the early 1990s to easily determine whether all farmland has been considered for the purposes of determining the ADAs.

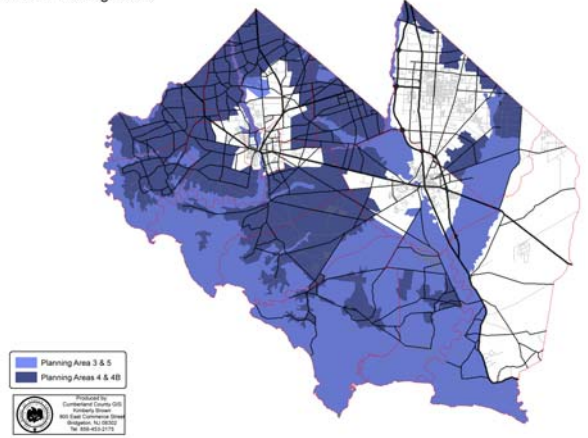


Appendix A – Maps

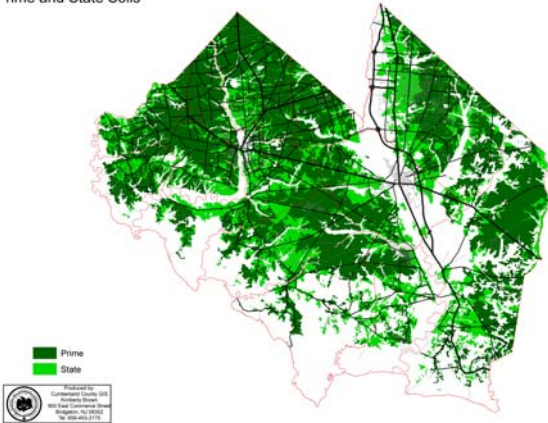
Identified Farmland



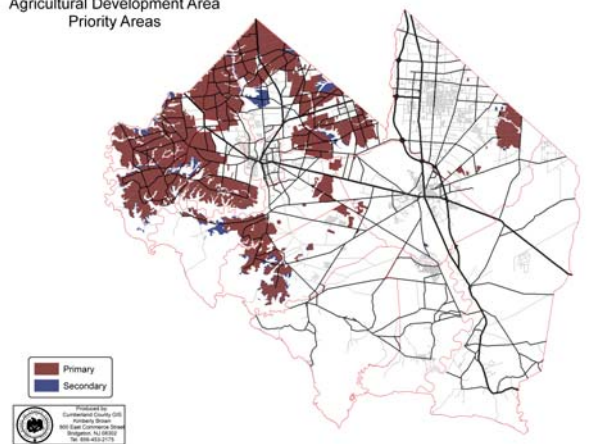
State Planning Areas



Prime and State Soils



Agricultural Development Area Priority Areas



Acknowledgements

Cumberland County Department of Planning & Development Staff
Cumberland County Agricultural Development Committee
Cumberland Empowerment Zone
NJ State Agricultural Development Committee

References

NJ Department Environmental Protection – 1978 Soils Data Layer
NJ Office of Smart Growth – 2002 State Planning Areas
Cumberland County Department of Planning & Development – Roads, Zoning, Farmland

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