ABSTRACT

Blueberries are a popular harvested fruit that many people enjoy eating. Blueberries also have several know health benefits such as being rich in Vitamin

C and E antioxidants. Blueberry plants unique nutrient requirements make the largely sandy soil textured, low-lying coastal plain of Atlantic County an ideal place to be grow cultivate them. The goal of this project was to identify, through a ranking system, areas potentially suitable for growing blueberries within Atlantic County. A Geographic Information System (ArcGIS) mapping tool was used to identify these areas of potential growth. Soil, zoning, transportation (roads) and irrigation information was collected, selected (by extraction), ranked, grouped and combined into an overall final ranking for blueberry growing suitability. The ranking system created is comprised of a scale that ranges from 1 to 9. 1 is the lowest possible ranked score while 9 is the highest possible score. The combined final rankings of the four criteria groups ranged from a score of approximately 2 to 9. The final combined map revealed several potentially suitable farming areas for blueberries growing within Atlantic County. The highest concentrations generally where observed in the north and central to western areas of the county within close proximity to rivers

Rank #1 (Atsion - Most Suitable) Rank #2 (Berryland) Rank #3 (Muck) Rank #4 (Lakewood, Hammonton)



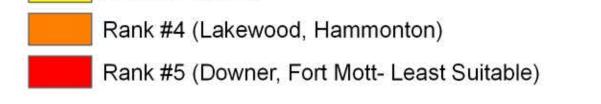




Fig. 1. Select Soil Rankings

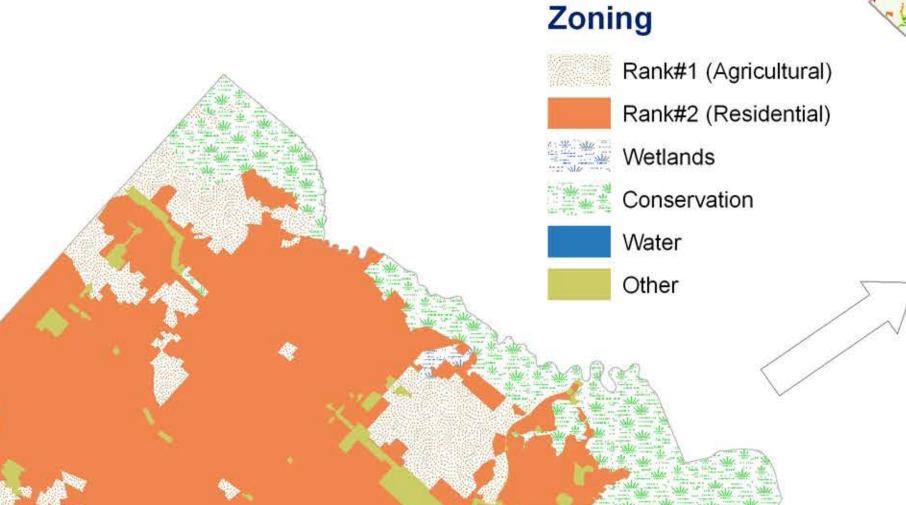


Fig. 2. Zoning Ranking



Blueberry Farm

Potential Blueberry Farm Locations in Atlantic County

Advanced GIS Course - ENVL3303

"Environmental Studies Program Richard Stockton College of New Jersey"

Objective: To identify potentially suitable land for farming blueberries in Atlantic County.



A Photo Showing Several Blueberrry Clusters

METHOLOGY

In order to rate Atlantic County's land suitability for blueberry farming, data based upon soils, zoning, lakes, rivers, streams, major roads and possible roads was extracted, ranked, combined and weighted on a percent scale. The ranking scale used is comprised of values ranging from 1 to 9. 1 is the lowest possible ranked score while 9 is the highest. Once ranked, all data was then combined into major criteria groups comprised of Soils, transportation (roads), irrigation and zoning. Finally, a weighted percent scale was created based upon the importance of each criterion. Zoning and soils where given each a 30% weight while the combined irrigation (rivers and lakes) and roads (major and possible roads) criteria each received a 20% weight. The total combined weighted scale equals 100%.

The soil series data for Atlantic County was extracted from the SSURGO soil database. Seven soils series where then selected by extraction, ranked and grouped into five rankings based upon ability to grow and produce blueberries. The newly created select soils map (Fig. 1.) includes the soil series: Atsion (rank 9), Berryland (rank 7), Manahawkin muck (rank 5), Lakewood (rank 3) Hammonton (rank 3), Downer (rank 1) and Fort Mott (rank 1) The ranks where comprised by using the NRCS official soil series description information http://soils.usda.gov/technical/classification/osd/index.html. The zoning information was referenced from Atlantic County's zoning data. The zoning map (Fig. 2.) shows different locations for zoning in Atlantic County. Only Agricultural and residential zoning data, through extraction from total zoning data, where ranked. Agricultural zoning received a ranking of 9 while residential zoning was given a ranking of 5. The reason residential zoning received a ranking at all is due to the potential that some wooded and field residential

zoning areas could be transferred into agricultural zoning. The select soils and zoning rankings where then combined and calculated so that only area that lies within the boundaries of both could be used in future calculations with irrigation and roads. The result is basically a soil and zoning template that has a weight average of both soil and zoning ranks (Fig. 3.). All other data is removed.

The lakes (open water areas) data was referenced from the NJDEP's Atlantic County lake data. Freshwater lakes data was extracted from the total county lakes data. Using the created soil and zoning template displayed in Figure 3., a lakes ranking was created based on distance (Fig. 4). An area 0 to 1200 feet in distance away from lakes received a ranking of 9. An area 1201 to 2400 feet in distance away from lakes received a ranking of 7.An area 2401 to 3600 feet in distance away from lakes received a ranking of 5. An area 3601 to 4800 feet in away in distance from lakes received a ranking of 3. Finally, a distance greater than 4800 feet away received a ranking of 1.The streams data was referenced from the NJDEP's Atlantic County streams data. Using the created soil and zoning template displayed in Figure 3., a streams ranking map was created based on distance from streams (Fig. 5). The ranking system used based on distance is exactly the same as the one for lakes which is noted in the above paragraph.

The major roads data information was referenced from the NJDOT's collection of state roads data. Atlantic County roads data was then extracted from the state data. Atlantic County major roads where then identify and extracted from all Atlantic County roads data roads Using the created soil and zoning template displayed in Figure 3, a major roads ranking map was created based on distance from major roads (Fig. 6). An area 0 to 4 miles away from a major road received a ranking of 9. An area 4 to 8 miles away from a major road received a ranking of 5. No area had a greater than 8 mile distance away from a major road. The all possible roads data is all of Atlantic Counties documented paved roads. It was referenced and extracted in the same fashion as major roads. The ranking system used is comprised five ranking values that are in 500 feet intervals away from all possible roads. The combined final map ranking (Fig. 8) was created from the weight total of all four criteria.

Irrigation

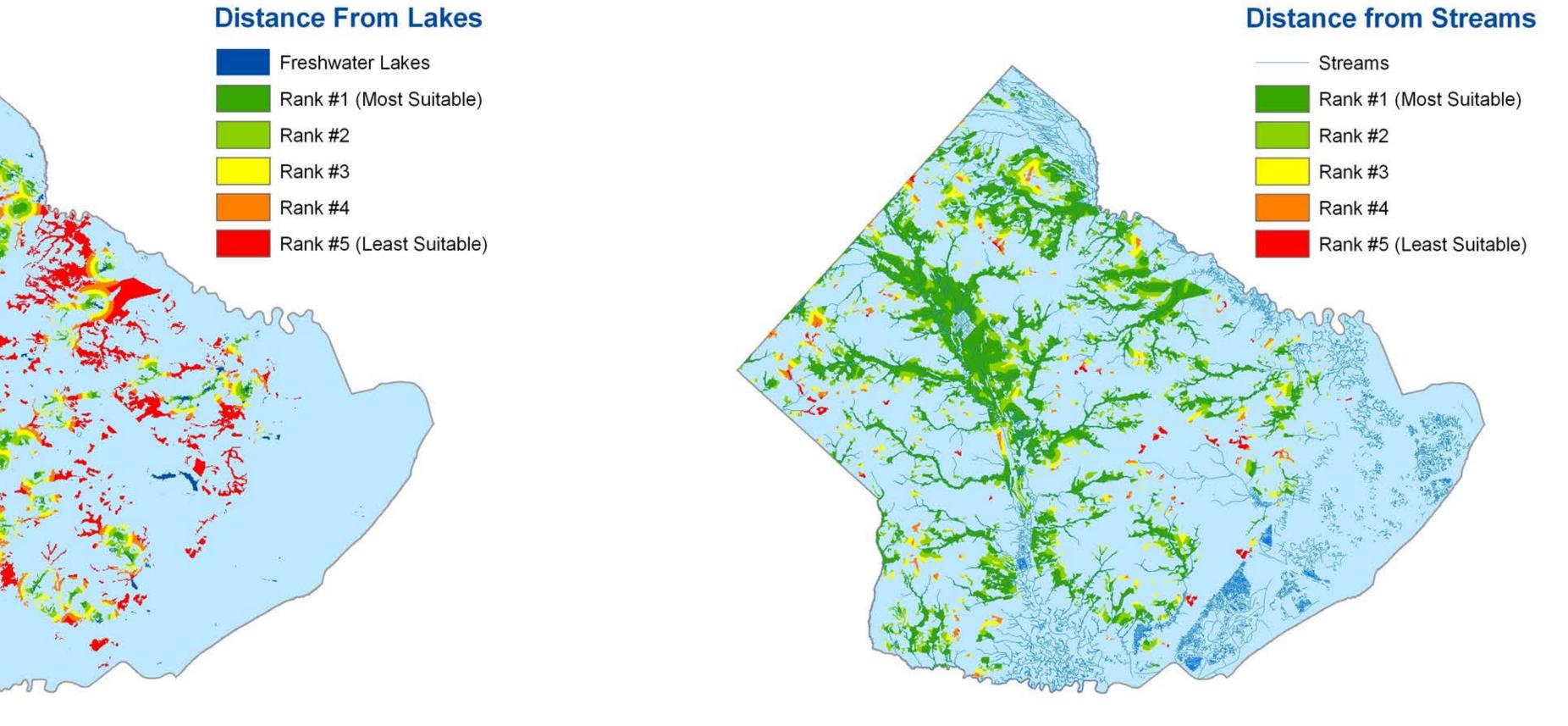


Fig. 4. Irriagtion Lakes Distance Ranking Fig. 5. Irrigation Streams Distance Ranking

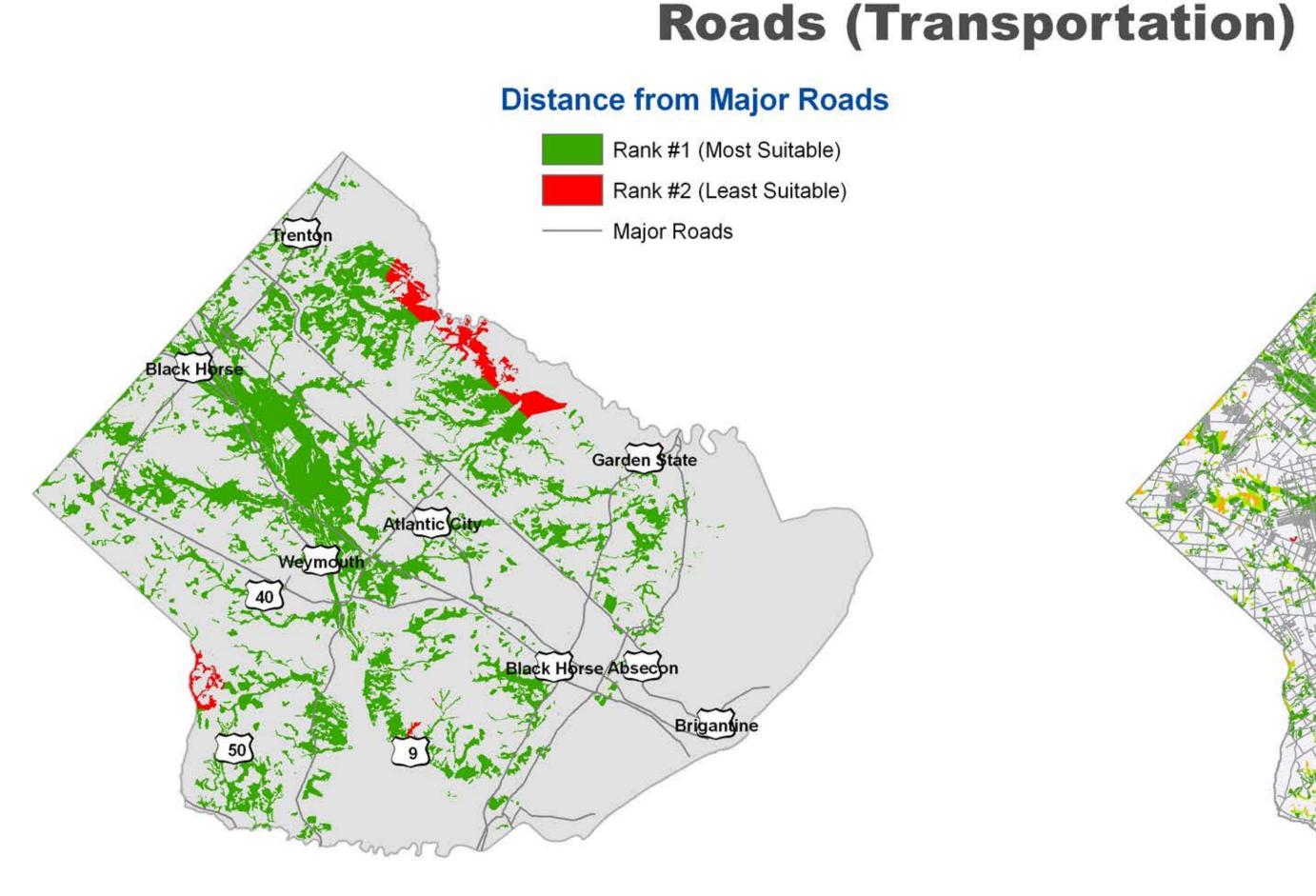


Fig. 6. Major Roads Distance Ranking

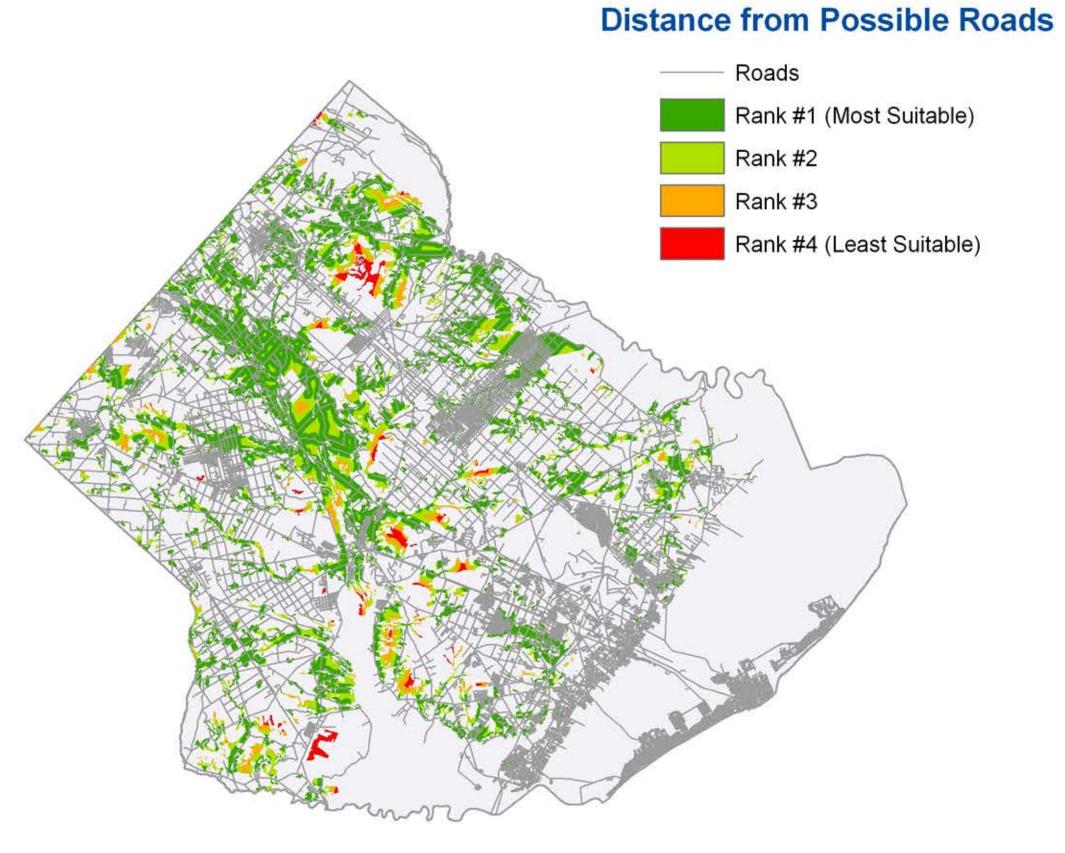


Fig. 7. Atlantic Roads Distance Ranking

CONCLUSION

Fig. 3. Soil & Zoning Combined Ranking

final ranking.

INTRODUCTION

Whether consumed fresh or combined and processed in products such as

cereals, snacks, and beverages, blueberries are a popular fruit

<www.blueberry.org>. Blueberries also have certain health benefits. Blueberries

are rich in Vitamins C and E antioxidants. Recent tests conducted by the USDA

Human Nutrition Research Center on Aging have shown that blueberries are

among the fruits that show rates highest antioxidant activity

http://www.blueberry.org/health.htm. A blueberry plants unique nutrients

requirements tend to differ greatly from most cultivated plants. Land areas that

contain sandy textured, low Ph soils combined with a relatively season high

water table are optimal locations for growing blueberries. Their unique growing

requirements make the sandy soiled, low-lying coastal plain of Atlantic County

ideal. In fact, Hammonton Township, located within Atlantic County, boastfully

proclaims itself as the blueberry capital of the world. The goal of this project

was to identify, by using a ranking system, the areas potentially most suitable

for growing blueberries. The four criteria considered for this project where soil,

zoning, transportation (roads) and irrigation (lakes, river and ground water)

ArcGIS (a mapping tool) was used to identify, extract, reorganize and rank the

data. Finally the combined ranking of all the data was compiled into an overall

Soil & Zoning

Rank #3

Rank #4

Rank #5

Rank #1 (Most Suitable)

Rank#6 (Least Suitable)

Based on the final combined results, there are several potentially suitable farming areas for blueberry farming within Atlantic County. The final combined map shows a general scattering of potentially suitable blueberry farmland throughout much of the county. The highest concentrations are displayed in the north and central-to-western areas of the county that lie within close proximity to the Great Egg Harbor River and Hammonton Creek. The results make sense because there is a higher concentration of farmland zoning in the northwestern part of the Atlantic County. You would also expect potential blueberry farmland areas to be close to rivers where soil and irrigation conditions are optimal. Because of high concentrations of conservation and wetland zoning, much of eastern to northeastern areas of the county are not suitable for blueberry farming In figure 9, the 2002 orthophotograph shows much of the area around the intersection of the Atlantic City Parkway and Route 54 in Hammonton to be ranked #1 for blueberry growing potential. Figure 10 takes a look at the different soil series that surrounds the intersection. Figure 11 takes a closer look at four tax lots, equaling just less than 68 acres, at the left upper corner of Atlantic City City Parkway and Route 54 intersection. The majority of the 68 acres is ranked #1 for blueberry growing potential. Finally, the purchasing of farmland preserved land would make the most sense both financially and environmentally. Land that is farmland preserved has a greater potential to be purchased at a reasonable price because the land can only be used for farming not development. Environmentally, it also makes sense because you're using land that's already used for farming not helping to destroy an ecosystem. There are also other benefits such as certain emanate domain rights and grant funding opportunities. However as of 2005, there are only 2 farms that are designated for farmland preservation.

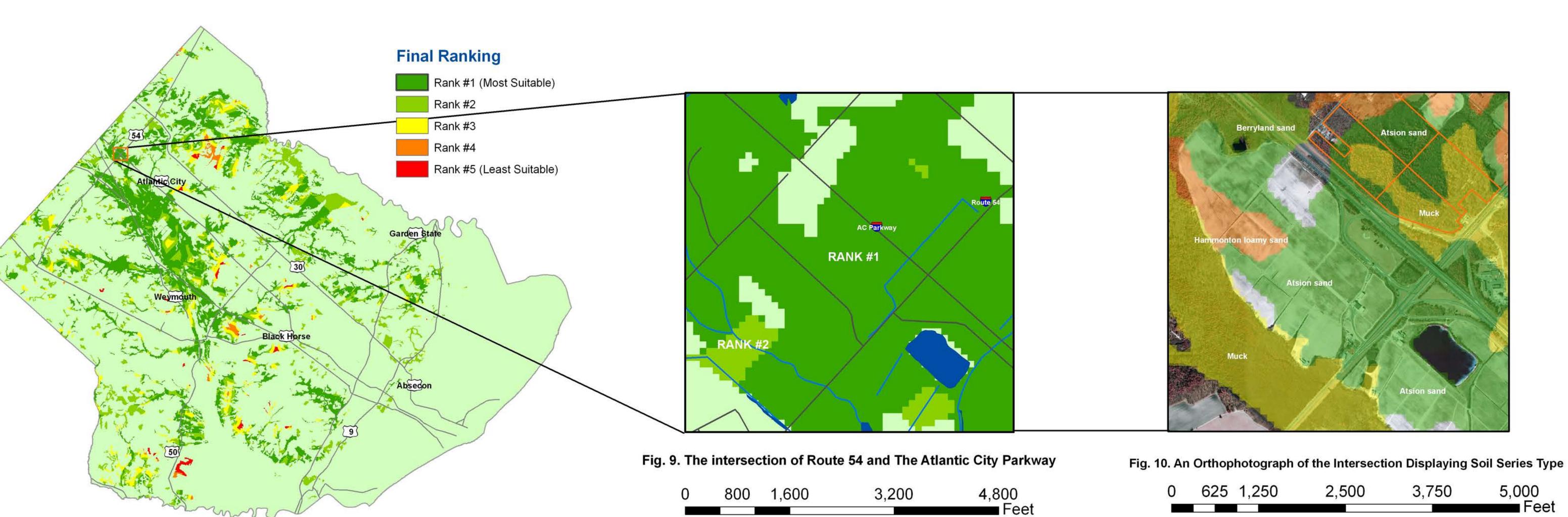


Fig. 8. Final Combined Ranking

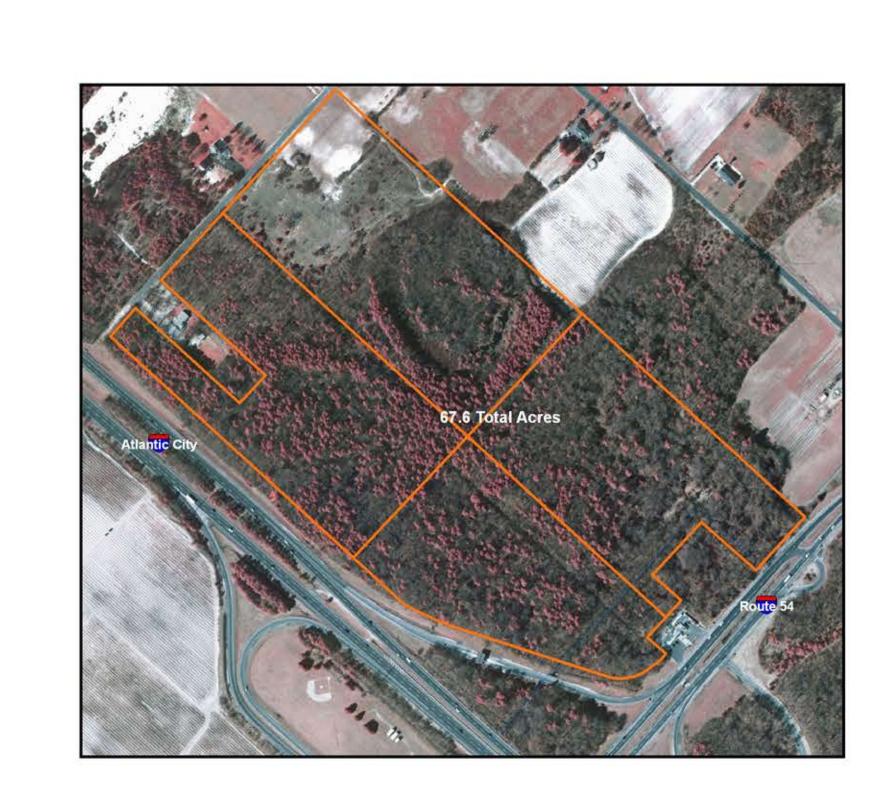


Fig. 11. Four Tax Lots That Have Excellent Blueberry Farming Potential

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