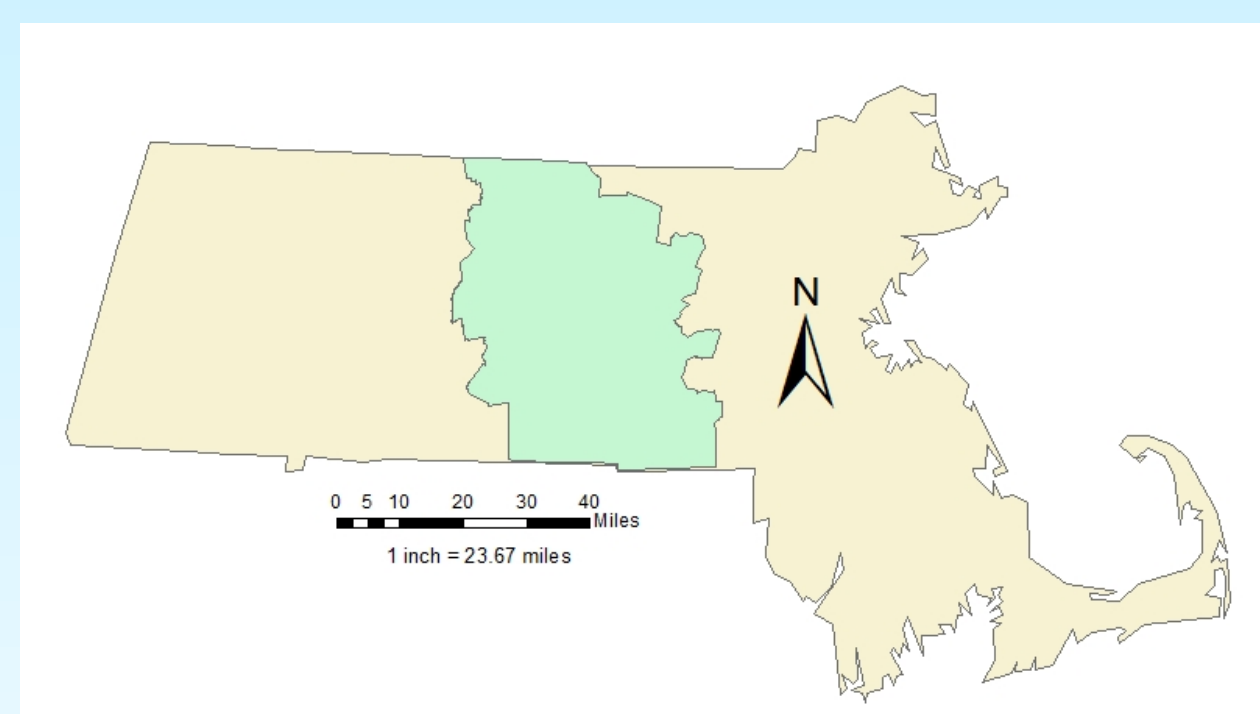# Identifying Pristine Wetlands with High Conservation Value in Worcester County, Central Massachusetts
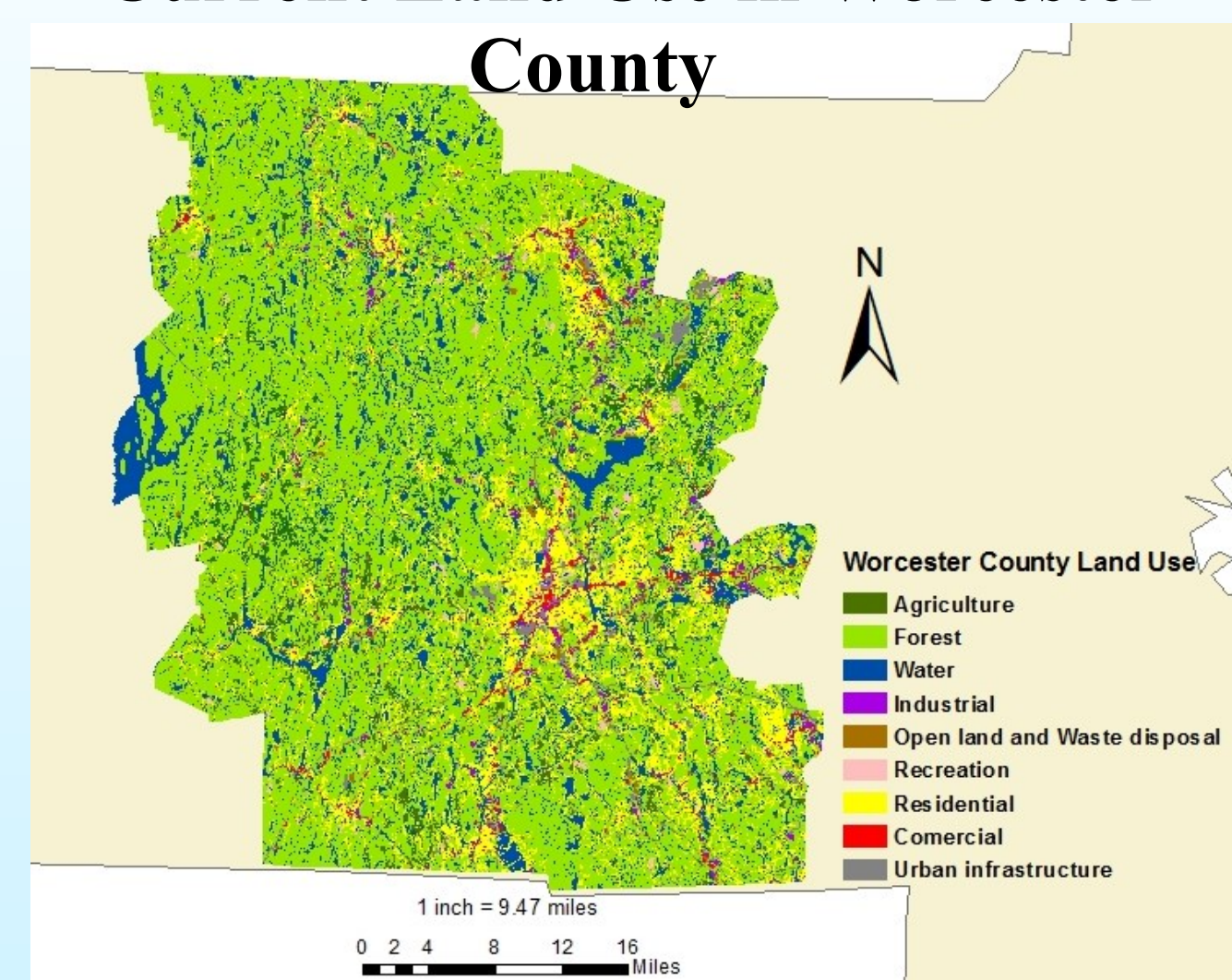
Tufts University

Introduction and Background

Wetlands are vital ecosystems on which the survival of countless species of animals, plants and other organisms depend. In addition, wetlands provide numerous "ecosystem services" that humans, either knowingly or unknowingly, enjoy; such services include water purification, flood prevention, coastline protection and habitat for game species.

Ironically, wetlands have historically been one of the most degraded types of ecosystems in the world. In the United States, wetlands are protected by the Clean Water Act. However, human progress is still a threat to wetlands everywhere. Wetland restoration and mitigation programs abound, but a far better approach to conserve wetlands is to identify and protect those wetlands with a high conservation value.

Current Land Use in Worcester County

Project Description

For this project I focused on the wetlands present in Worcester County, Central Massachusetts, and identify and identify those that have presumably been the least affected by human activities, and are therefore of higher ecological value and should have higher priority for conservation projects.

Wetland Conservation Value
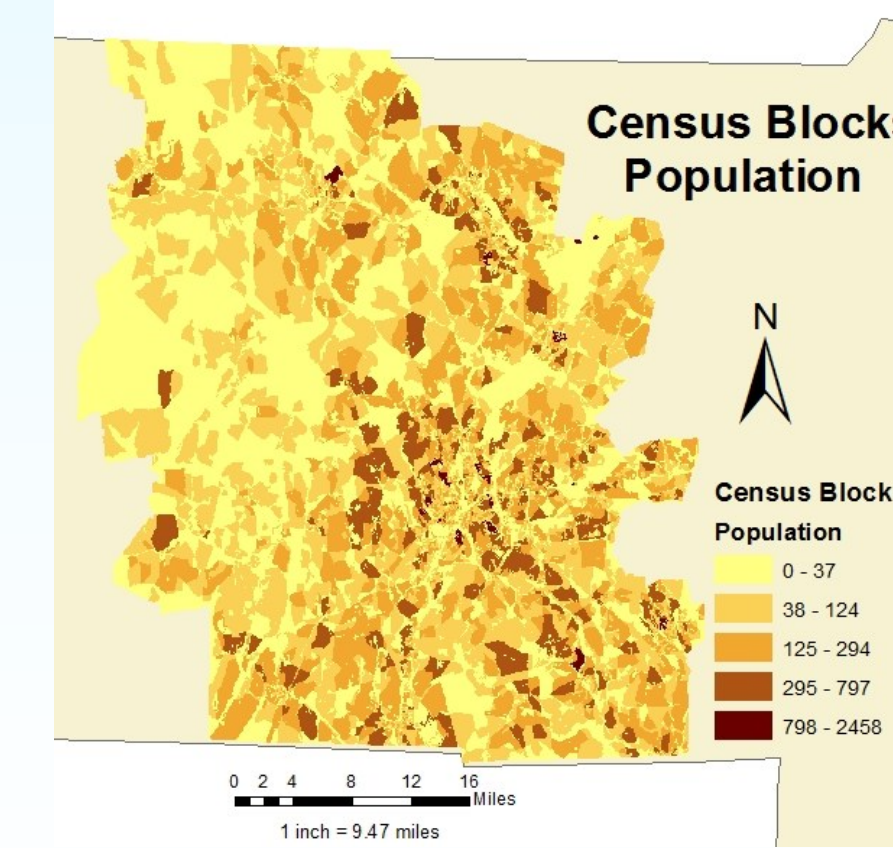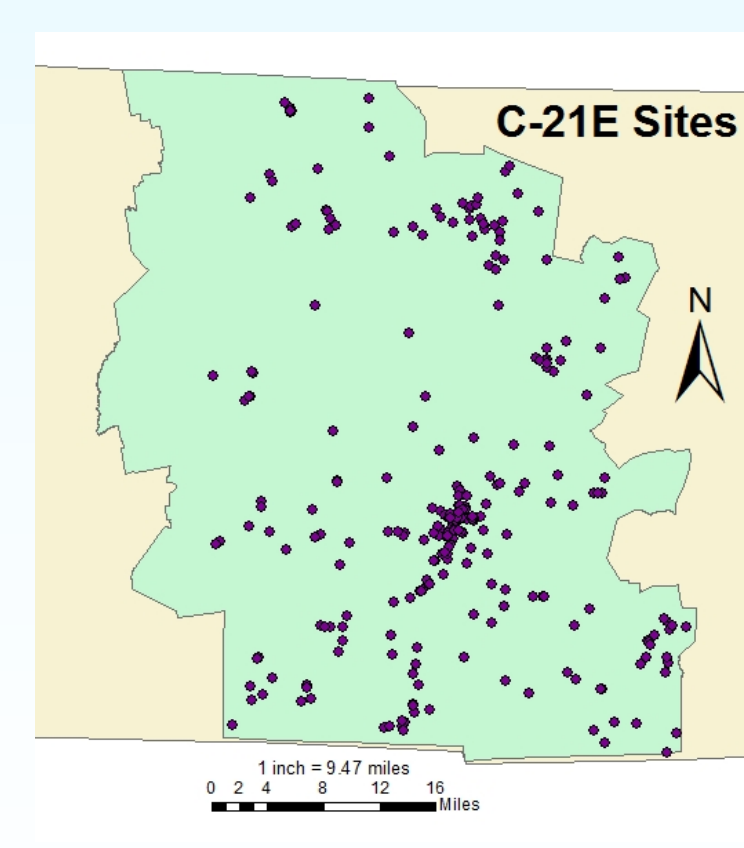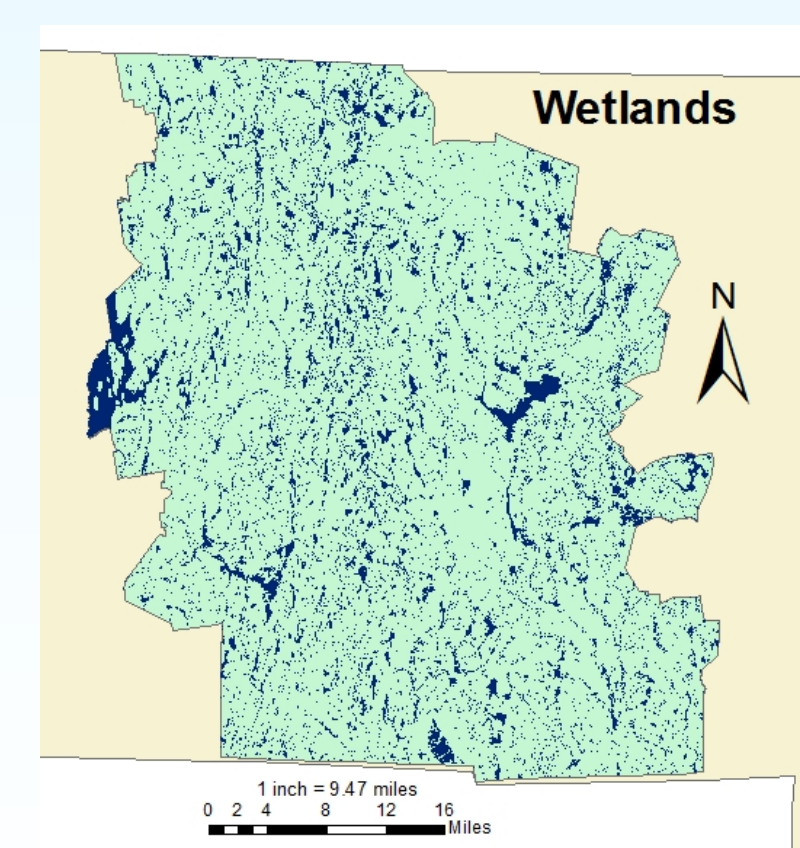
Spatial Question

In order to identify "pristine" wetlands, I used distance from 3 anthropogenic sources of pollution as my criteria to determine which wetlands demand the most protection. The sources of pollution I focused on were 1) Heavily populated areas (census block with higher population density) , 2) major highways and 3) c 21E sites.

Methodology

I obtained All data layers from MassGis, and uploaded them to ArcMap 10.1 for analysis. All data layers were verified to be in the same coordinate system. Using selection tools I created new data layers containing only those features located within Worcester County.

For each the 'Wetlands,' 'Major Roads,' and 'C-21E Sites' data layers I used distance tools in order to create a raster grid from vector data. For the Census Blocks layer I used density tools in order to create a population density raster grid.

Analysis

With my raster data I reclassified all data by creating a 1 – 5 ranking, with 1 being the closest and 5 the farthest from Major roads and C-21E sites. For population density the ranking was reversed, with 1 being areas with the highest and 5 the areas with the lowest population densities. For Wetlands, the ranking was also reversed, with 5 being the closest and 1 being the farthest from other wetlands based on the principle of habitat continuity.

Using the Raster Calculator I combined my raster grids in order to obtain a countywide conservation value ranking ranging from 2 (lowest) to 10 (highest).

Results and Conclusions

After the final raster analysis, I was able to identify those areas with the lowest and highest values for wetland conservation. As we can observe there is variability throughout the county, with those areas on the Northwest and Southeast of the county holding the highest wetland conservation value based on the criteria I established.