

Prison Rates and the Built Environment: A Case for Green Space

Project Overview

Sociologists highlight the importance of physical space, and the built environment, in contributing to a number of social and health incomes. Vacant land has been connected to an increase in violence, criminal activity, and stress that result in lower rates of community cohesion (Branas et al). On the other side, green space has been shown to have a number of positive physical and mental health outcomes for individuals. It can also increase a sense of community cohesion, social capital, and defensible neighborhood space (Kuo, Sullivan).

In this project I look at prison admission rates in Philadelphia neighborhoods, and compare these with both socio-economic and physical characteristics of those neighborhoods.

Methods

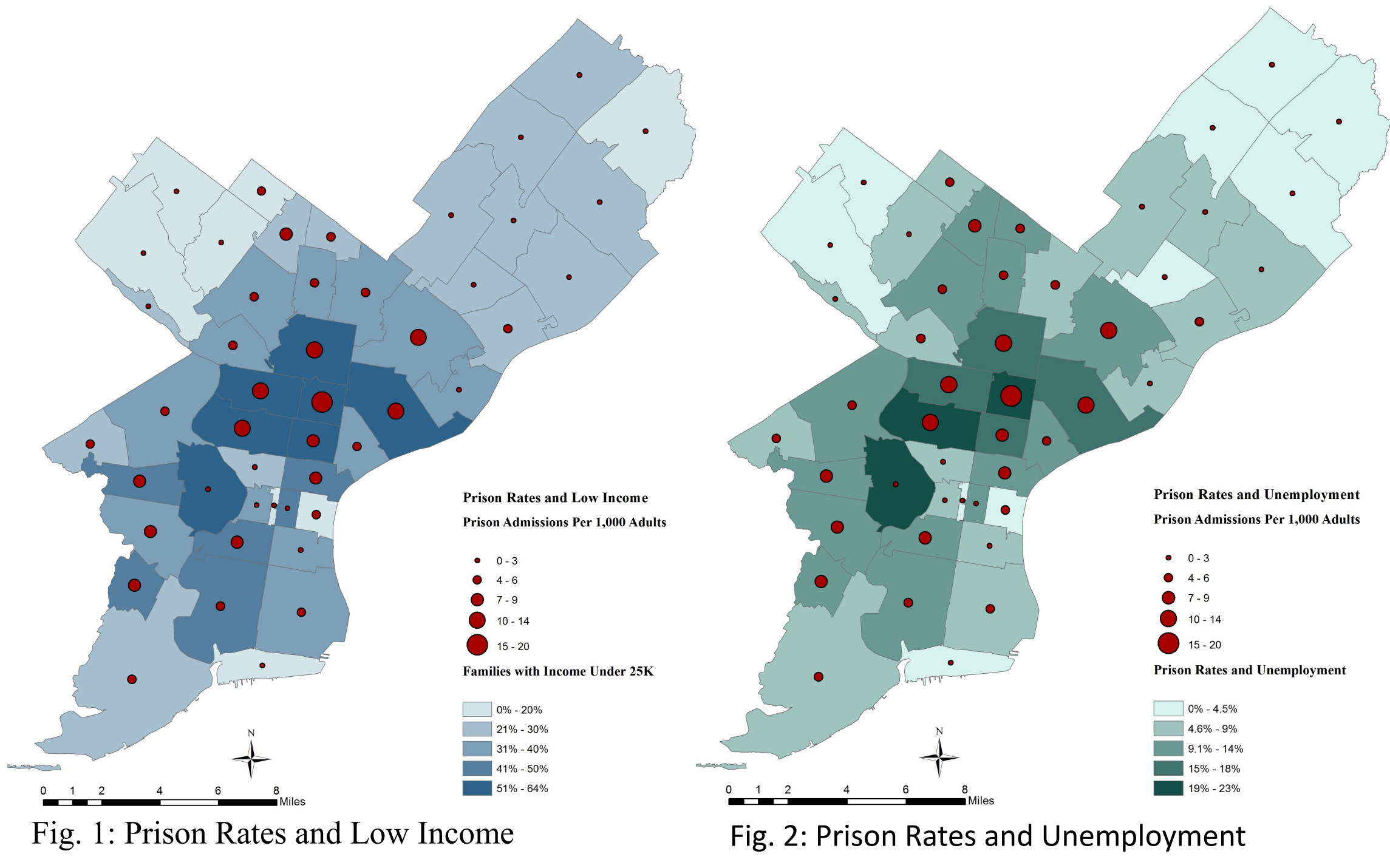
I processed land type data (vacant land, and green space) in several ways in order to compare it to the prison rate information by zip code. First, I used a field-to-point conversion of land type polygons to avoid the issue of polygons that slightly crossed a zip code boundary, or crossed slightly outside my projected Philadelphia boundary. I used a spatial join to attach zip codes to each land type, aggregated the sum of each land type by zip code, and joined that data to the prison data layer. I then calculated land type area as a percent of total zip code area.

Results

Unemployment rate and low income provide very predictable results. One can see a strong correlation between high rates of these socio-economic factors, and high rates of prison admission.

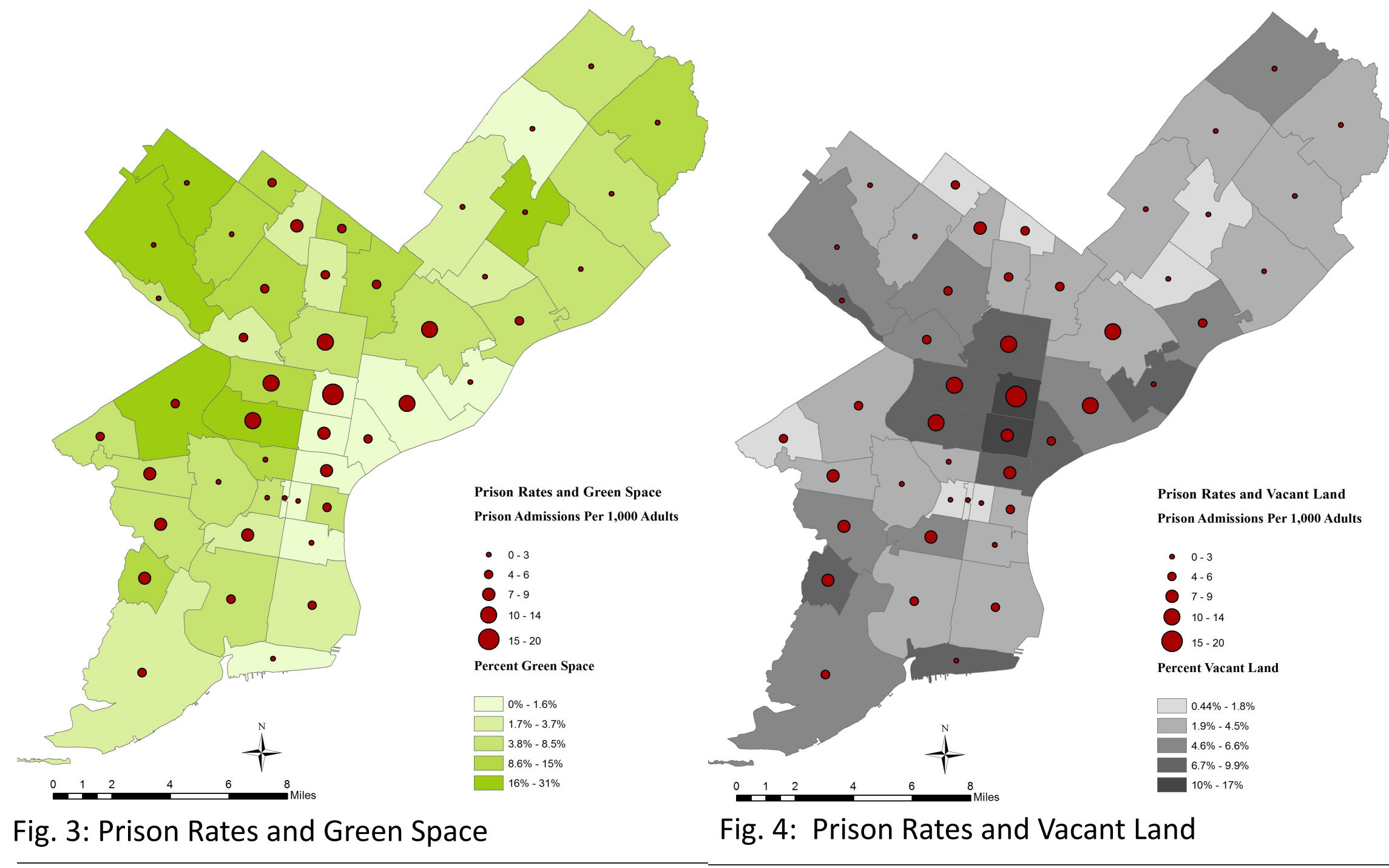
Map by Karen Bustard, Intro to GIS, Tufts University 2012, Professor Carl Zimmerman.
Data Sources:
Justice Atlas: <http://www.justiceatlas.org/>
Philadelphia City Commission Land Use: <http://opendataphilly.org/opendata/resource/170/land-use/>
References:
Branas CC, Cheney RA, MacDonald JM, Tam VW, Jackson TD, Ten Have TR: "A difference-in-differences analysis of health, safety, and greening vacant urban space". American Journal of Epidemiology 2011; 174: 1-11
Brunson, L, Kuo, F. E., and Sullivan, W. C. "Resident Appropriation of Defensible Space in Public Housing: Implications for Safety and Community". Environment and Behavior 2001 33: 626
Kuo, F. E., and Sullivan, W. C. "Aggression and Violence in the Inner City: Effects of Environment via Mental Fatigue". Frances E. Environment and Behavior 2001 33: 543
Kuo, F. E., and Sullivan, W. C. Fertile Ground for Community: Inner-City Neighborhood Common Spaces American Journal of Community Psychology, Vol. 26, No. 6, 1998

Prison Rates and Socio-Economic Factors



The built environment also demonstrates results to support the literature. Vacant land tends to be strongly correlated with higher rates of prison admissions. On the other hand, green space tends to be more concentrated at the periphery of the city, and in neighborhoods with lower prison admission rates. From the Built Environment Map one can see these two trends together.

Prison Rates and the Built Environment



The neighborhood of Cobbs Creek provides a compelling point of comparison between the four maps. Prison admissions in Cobbs Creek are relatively low, at a rate of 2.94 per 1,000 adults, even though low-income families and unemployment rates are at some of the highest in the city. When comparing the built environment for this area however, one finds that the proportion of vacant land is very low. This suggests that vacant

land could play an important role in establishing the factors that contribute to low crime rates in Cobbs Creek, more so than unemployment or low income.

Conclusion

Socio-economic outcomes help to describe a neighborhood and its characteristics, yet the physical environment also plays an important role in determining, and describing a place. This project helps to visualize patterns in both social factors and the built environment across the city of Philadelphia, in comparison to prison admission rates. It largely supports research in sociology stressing the importance of the built environment on social outcomes and community cohesion. Vacant land can contribute to stress, crime, and a lack of community cohesion, yet green

Vacant Land and Green Space

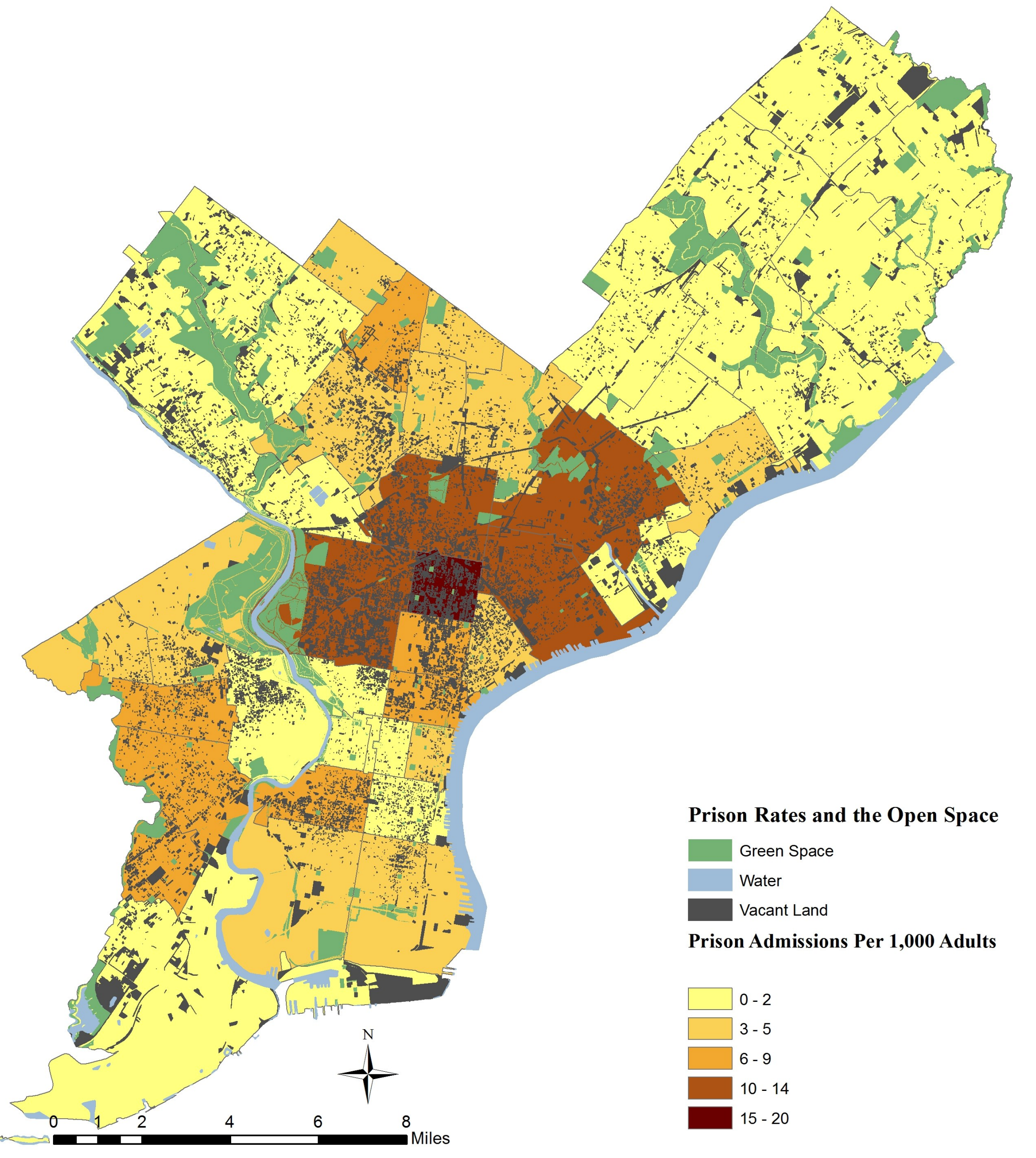


Fig. 5: Vacant Land, Green Space, and Prison Rates