

ABSTRACT

Anecdotal evidence suggests that historically African American communities on the fringes of cities and towns in North Carolina have been systematically denied access to municipal drinking water service. This paper presents the first statistical analysis of the role of race in determining water access in these fringe areas, known as extraterritorial jurisdictions. Using publicly available property tax data, we quantified the percentage of residences with municipal water service in each census block in Wake County (the second-largest by population in North Carolina). Using the resulting water service maps plus 2010 U.S. Census data, we employed a logistic regression to assess whether race is a significant predictor of water service access in census blocks within extraterritorial jurisdictions when controlling for household income. We find that every ten percent increase in the African American population proportion within a census block increases the odds of exclusion from municipal water service by about 4% ($p < 0.05$). These results suggest the need for follow-up research to explore the resulting health implications, especially because previous studies have shown that the private wells upon which such unserved communities rely for potable water are at elevated risk of contamination from leaking septic tanks and other sources.

BACKGROUND: RACIAL EXCLUSION

- Anecdotal reports provide evidence of racial disparities in access to municipal water and sewer service in North Carolina.
- Disparities are a legacy of exclusionary zoning practices from the Jim Crow era:
 - Municipalities drew borders to exclude African Americans (Fig. 1).
 - Municipalities nonetheless controlled land-use and zoning decisions in these excluded areas.
- Private water wells in excluded communities are at risk of contamination from failing septic systems and other sources and hence pose a public health risk (Fig. 2).
- The locations of excluded communities have not been systematically mapped—the first step needed to redress these disparities.
- Excluded communities fear identifying themselves due to historical mistrust of government agencies and fear of having their property condemned.

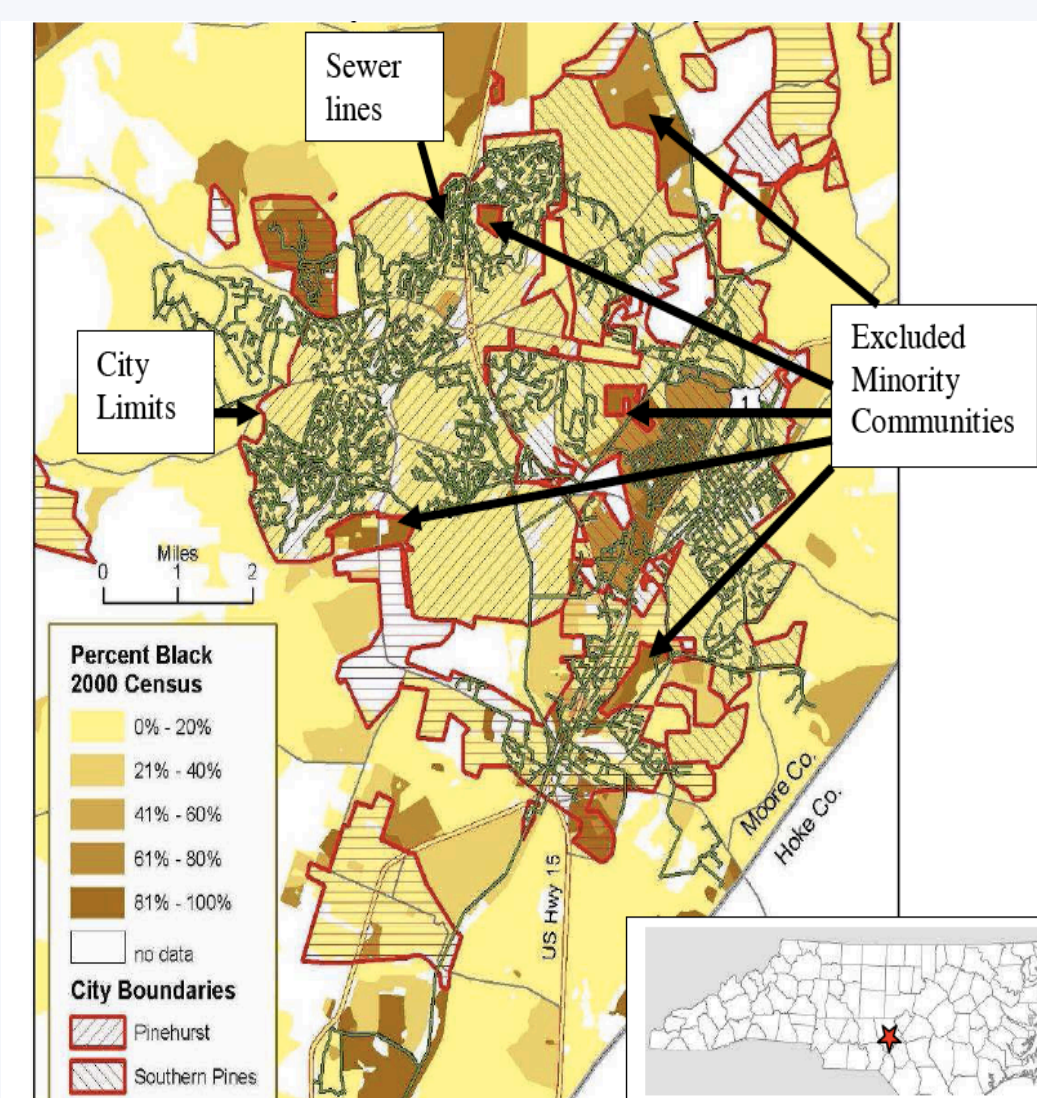


FIGURE 1. Formerly excluded communities near Pinehurst, NC. Green lines show sewer service connections. Minority communities were excluded from water and sewer service until negative publicity around the 2005 U.S. Open Golf Tournament in Pinehurst and support from civil rights organizations led to service extensions. However, many such excluded communities remain unidentified and without services. Source: Moss Joyner and Christman, 2005.

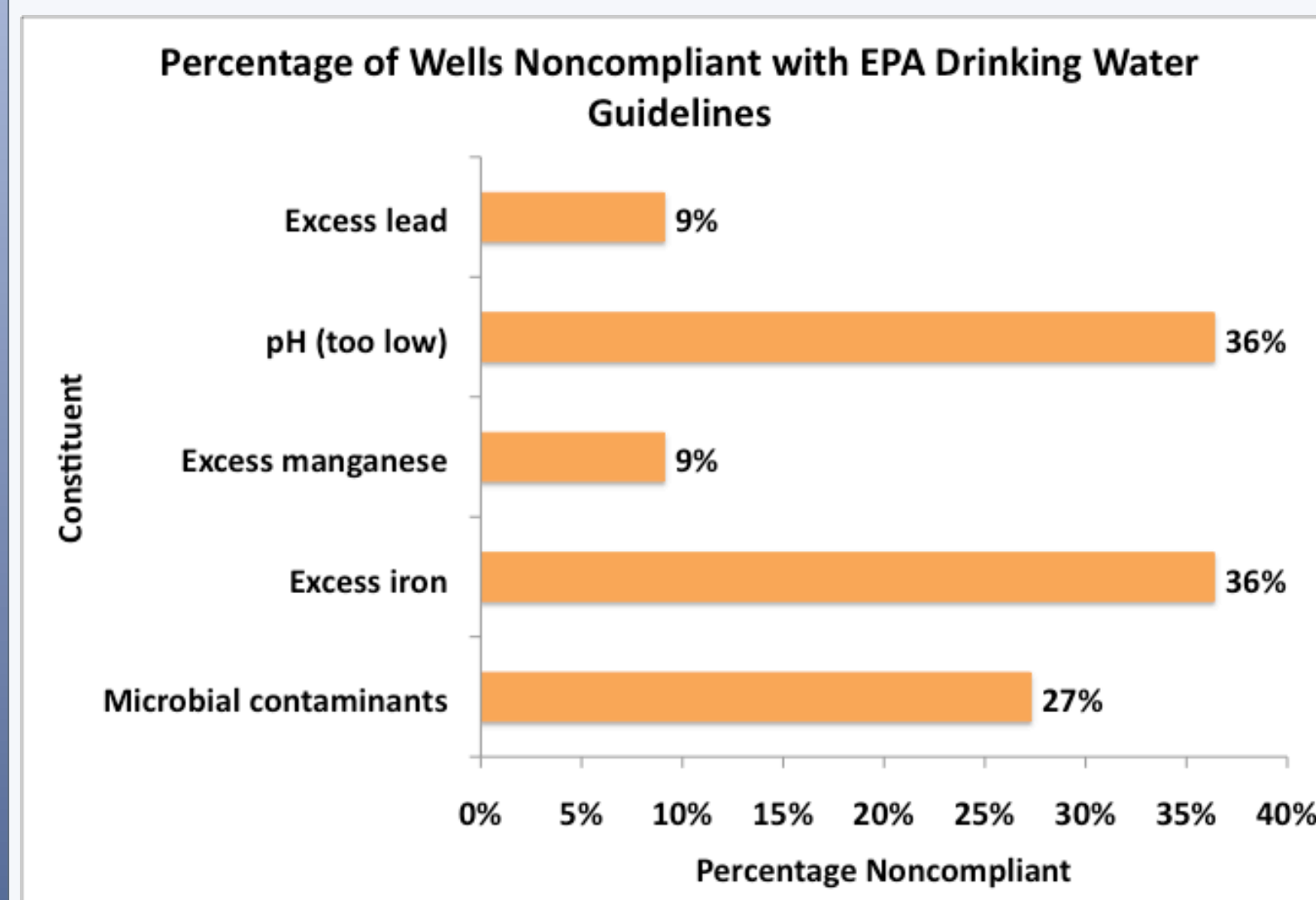


FIGURE 2. A health department assessment in an excluded community in Chapel Hill, NC, found private wells were at high risk of contamination. Source: Orange County Health Department, 2010.

OBJECTIVE: MAP EXCLUDED COMMUNITIES

This study's main objectives were to answer two questions:

1. What are the locations of excluded communities in Wake County, NC? How many people are excluded?
2. Is there evidence of racial bias in access to water and sewer service in Wake County?

A broader objective was to develop a method for mining publicly available data to map excluded communities in other counties.

METHODS

- U.S. Census blocks within extraterritorial jurisdictions of Wake County municipalities were identified from the Wake County Geographic Information Systems Division.
- Tax data were used to compute the percentage of homes with municipal water supplies in each Census block. Blocks were coded as 1 if all homes lacked water service and as 0 otherwise.
- A logistic regression was run in *R* with the 0-1 coding of water service availability as the dependent variable and percent black and median household income as independent variables.

RESULTS: RACE A SIGNIFICANT FACTOR

- About 11,300 residents of Wake County extraterritorial jurisdictions lack access to community water service—12.6% of the total extraterritorial jurisdiction population of 89,600.
- About 6,610 residents of the extraterritorial jurisdictions (7.3% of the total population) live in majority African American neighborhoods, and about 1,220 (18.4%) residents of these African American communities lack water service (Fig. 3).
- Every 10% increase in the African American population proportion increases the odds of being without water service by about 4% ($\exp(\beta)$ for logistic regression = 1.44, $p < 0.05$) (Fig. 4).

CONCLUSIONS

- This research uncovers disparities in access to treated municipal drinking water that potentially could contribute to observed racial disparities in health in Wake County.
- Public health practitioners can use the results to advocate for municipal service extensions to the affected communities.
- The methods employed can be extended to other counties and states.

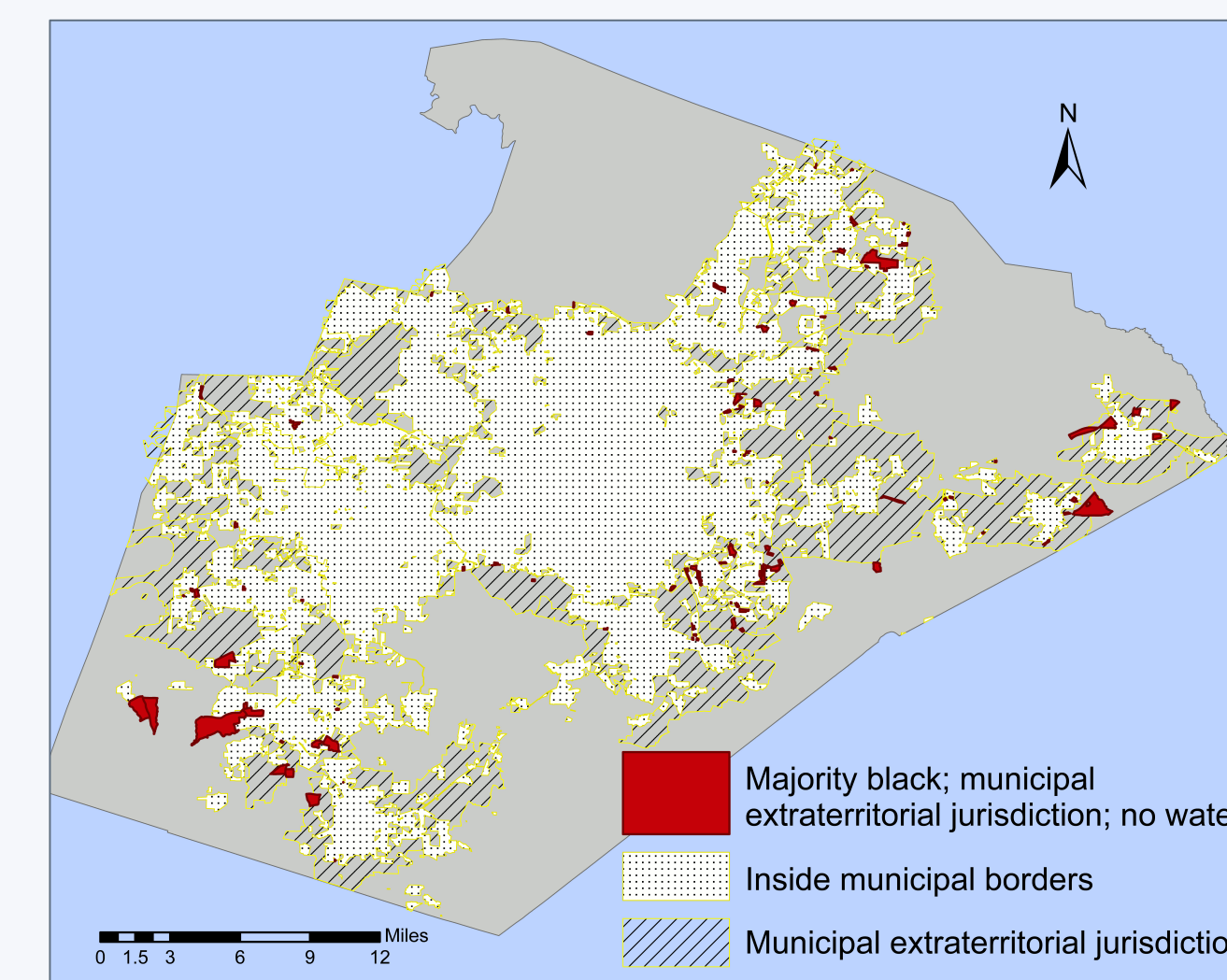


FIGURE 3. African American communities within Wake County extraterritorial jurisdictions that lack municipal water service. As shown, some are entirely surrounded by areas (white cross-hatched) with full municipal services.

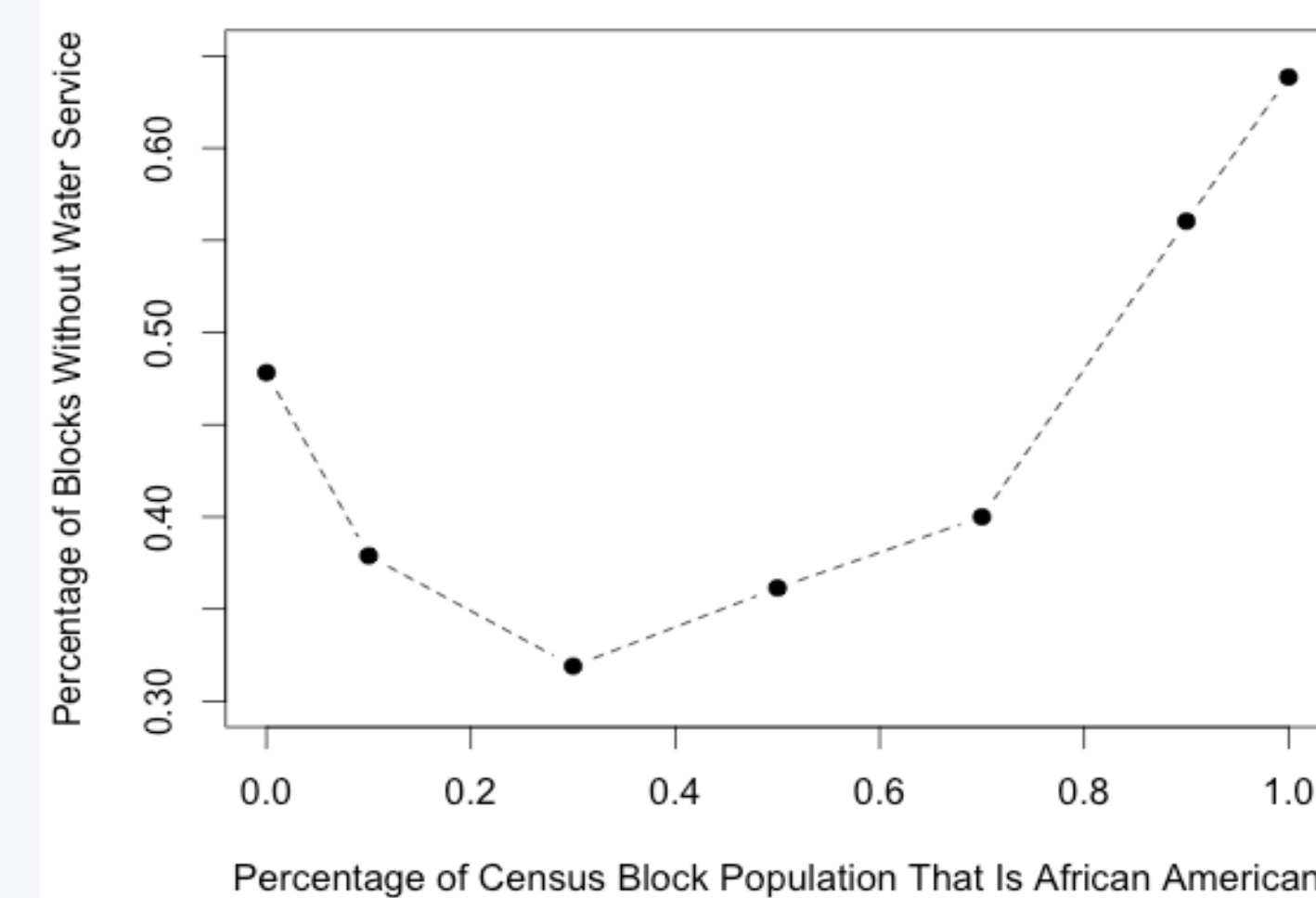


FIGURE 4. In Wake County, NC, extraterritorial jurisdictions, provision of municipal water service declines as the African American portion of residents in a Census block increases above about 30%. In Census blocks that are exclusively African American, nearly 64% of the population lacks municipal water service.

REFERENCES: Moss Joyner, A., and C. Christman, 2005. Segregation in the Modern South: A Case Study of Southern Moore County. Mebane, NC: Cedar Grove Institute.
Orange County Health Department. 2010. Well and septic assessment in the Rogers-Eubanks neighborhood area. Chapel Hill, NC: Orange County Health Department.