

# Predicting Land Use Change and its Effect on Nonpoint Source Pollution

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## PROBLEM AND RESEARCH OBJECTIVES

Urban sprawl causes numerous harmful environmental and health effects, including air pollution, water supply reductions, water pollution, and increased asthma incidence. Because many sources of urban pollutants are numerous and diffuse in nature, effective regulation poses many challenges. As a consequence, regulations intended to reduce urban sprawl may be an indirect means of mitigating the environmental and health impacts of urban sprawl. Albuquerque's development density is one of the lowest of the largest 100 metropolitan areas in the U.S. One possible means of curbing sprawl is imposing smaller minimum lot sizes, although prior research has provided mixed evidence regarding the effect of minimum lot sizes on residential development. We use econometric analysis methods to test the effectiveness of smaller minimum lot sizes for increasing Albuquerque's development density and decreasing sprawl in the Albuquerque area.

## METHODOLOGY

Econometric models are analyzed using data from Albuquerque and surrounding areas. The data set includes all parcels which as of 1999 were zoned for residential use and which were currently either vacant or used primarily for agricultural production. Logit models are used to estimate the probability of residential development as a function of the parcels' physical characteristics and zoning designation, surrounding land use, access to amenities, and the area's sociodemographics. Parameter estimates are subsequently used to predict future residential development patterns under both the current zoning designation and a modified zoning designation that reflects smaller minimum lot sizes.

## PRINCIPAL FINDINGS

Econometric results indicate that parcels' physical characteristics and zoning designation, surrounding land uses, access to amenities, and the area's sociodemographics explain a significant portion of the area's residential development pattern. When econometric results are used to predict the future pattern of residential development, a comparison of predicted development patterns under the current and revised zoning designations indicates that smaller minimum lot sizes may increase the frequency of sprawl-area residential developments. Smaller minimum lot sizes do not appear to be an effective means of controlling Albuquerque's urban sprawl.



*Ph.D. student Gwendolyn Aldrich and Professor Janie Chermak confer on research project.*