

Landscape Characteristics Affecting Use of Rodenticides



Matthew Schwartz
Geo 580
Environmental Science Graduate
Program

Landscape Characteristics Affecting Use of Rodenticides

- Two categories of pest control
 - Physical – snap traps, glue boards
 - Chemical
 - Bromethalin
 - Vitamin
 - Anti-coagulants



Landscape Characteristics Affecting Use of Rodenticides

- Although intended to cause death in a single feeding, a time lag between ingestion and death exists with anti-coagulants
- An increase in the concentration of rodenticides in wildlife populations could affect stability of carnivore populations when coupled with other stresses (Riley et al. 2007).



Objectives

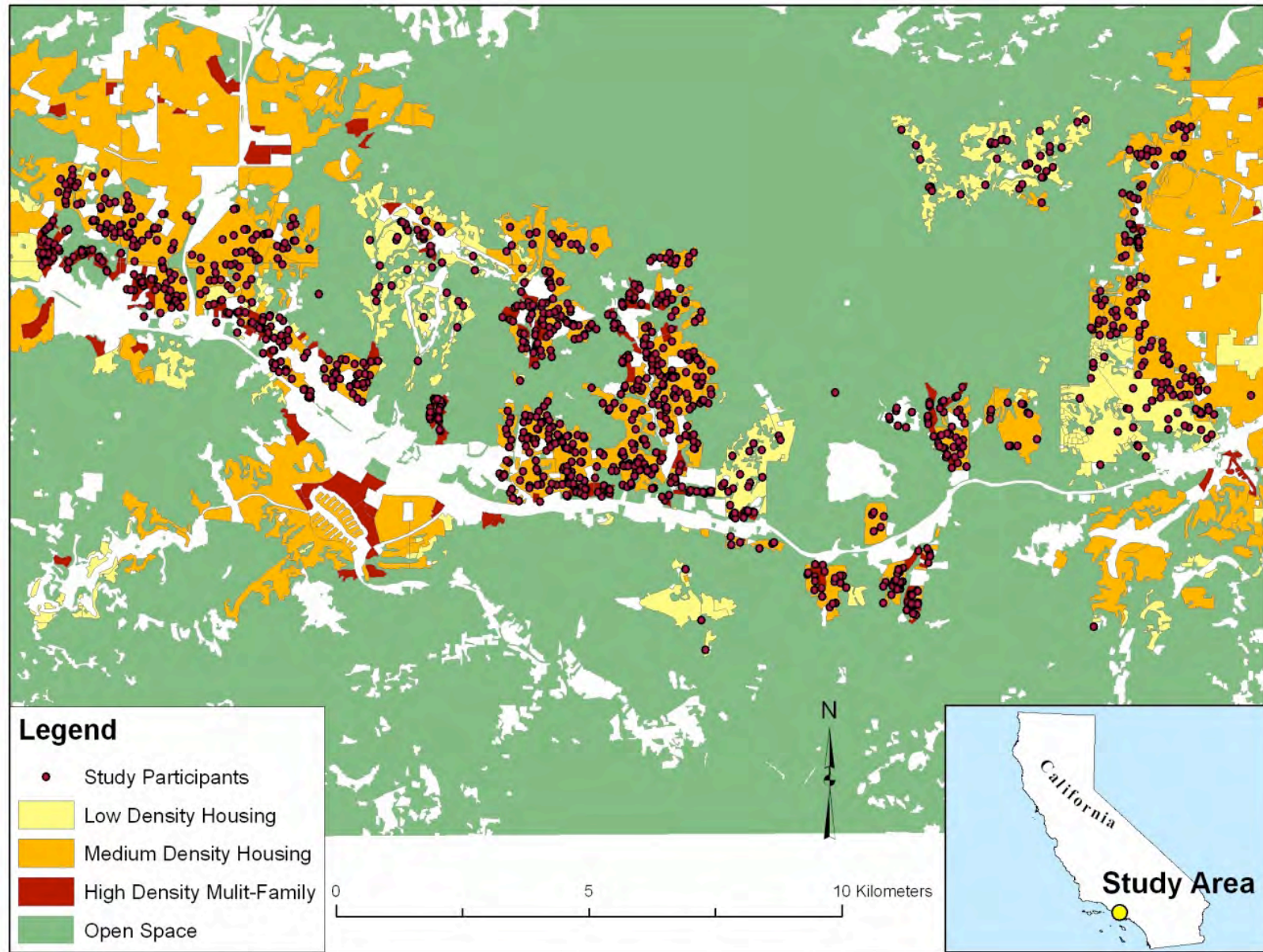
- Does a relationship exist between all pest control use, chemical pest control use, and rodenticide and each of the following

- ✧ Proximity to open space

- ✧ Housing Density

- ✧ Building Age

SAMO study area



Source: National Park Service
Morzillo et al.

Carnivore use of the Santa Monica Recreation Area and associated urban areas



Slide Courtesy of A. Morzillo

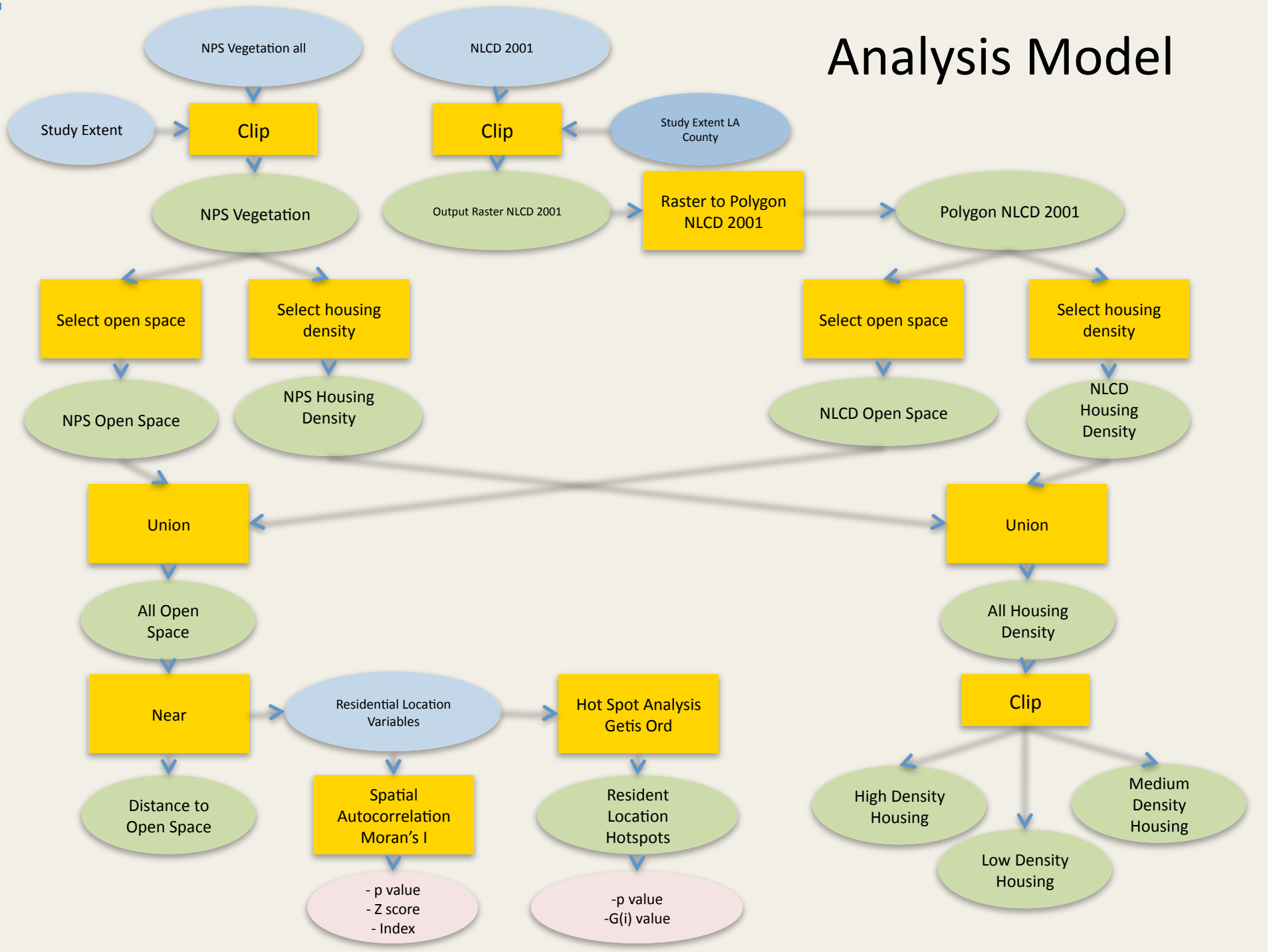
Methods

- Surveys participants randomly selected
 - Pest Definition
 - Pest Control: No = 0, Yes = 2
 - Chemical Pest Control: No = 0, Yes = 1
 - Rodenticide Use: No = 0, Yes = 1
- Residences included single house, condo, or apartment

Methods

- Used ArcGIS 9.3.1 to create data layers representing different types of land use and housing density
 - National Park Service
 - Santa Monica Mountains National Recreation Area and Environs
 - National Landcover Dataset
 - Multi-Resolution Land Characteristics Consortium

Analysis Model



Methods

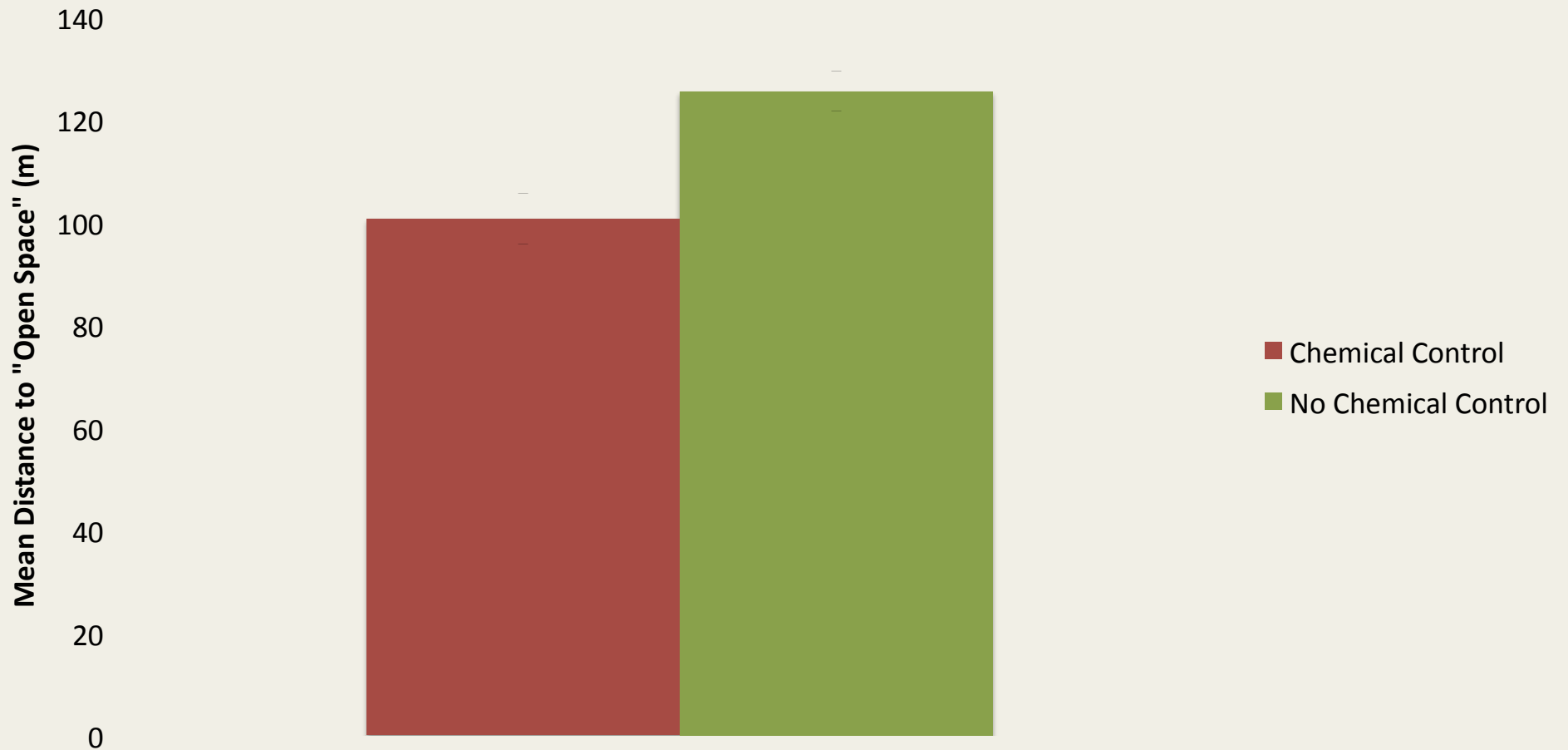
- Euclidian distance used to measure from each participant point to the edge of the nearest open space
- Chi-squared test used to determine difference between “yes” and “no” responses related to different housing densities

Results – All forms of pest control



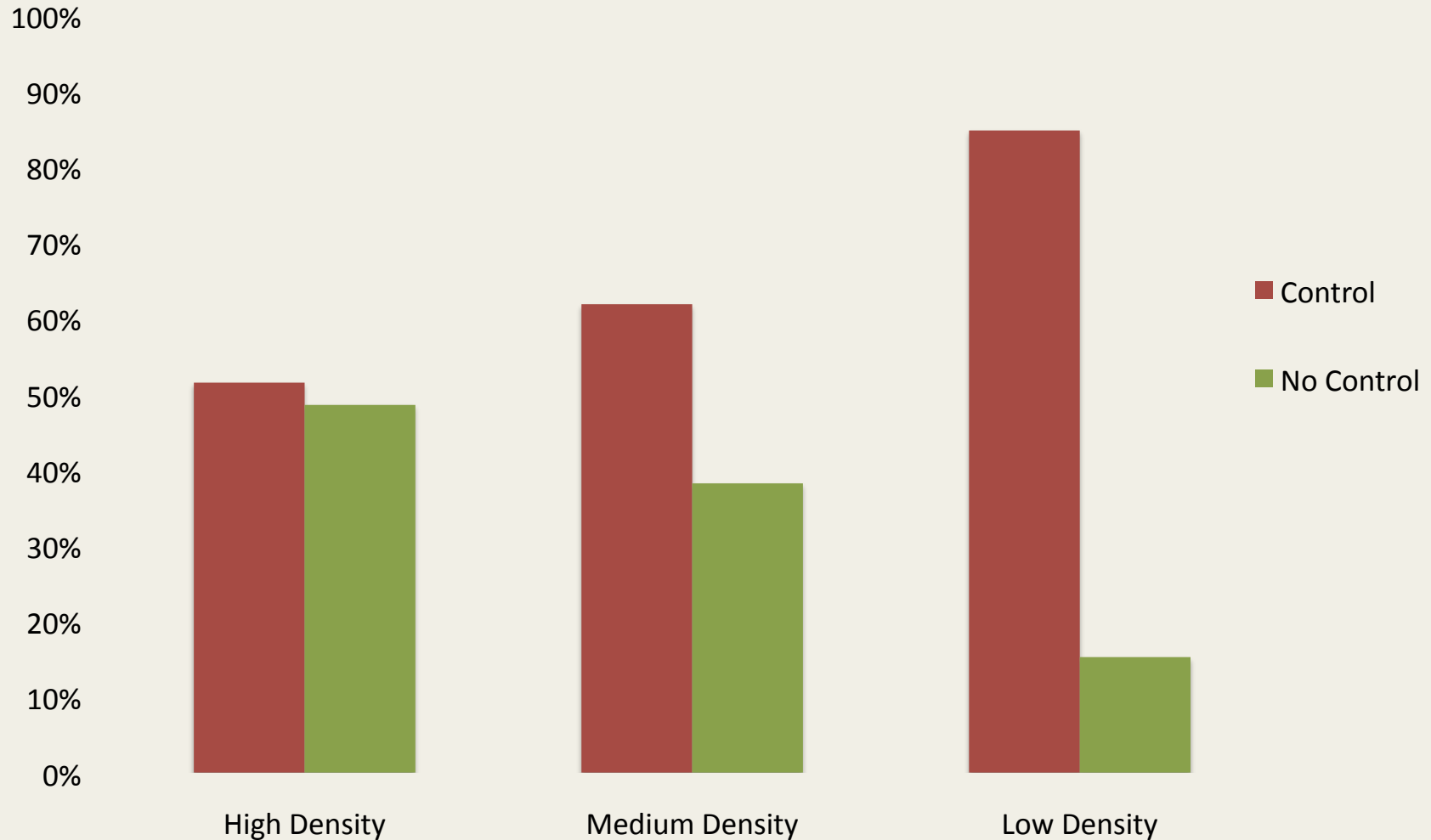
Mean proximity to open space for pest control and non pest control users

Results – Chemical Pest Control

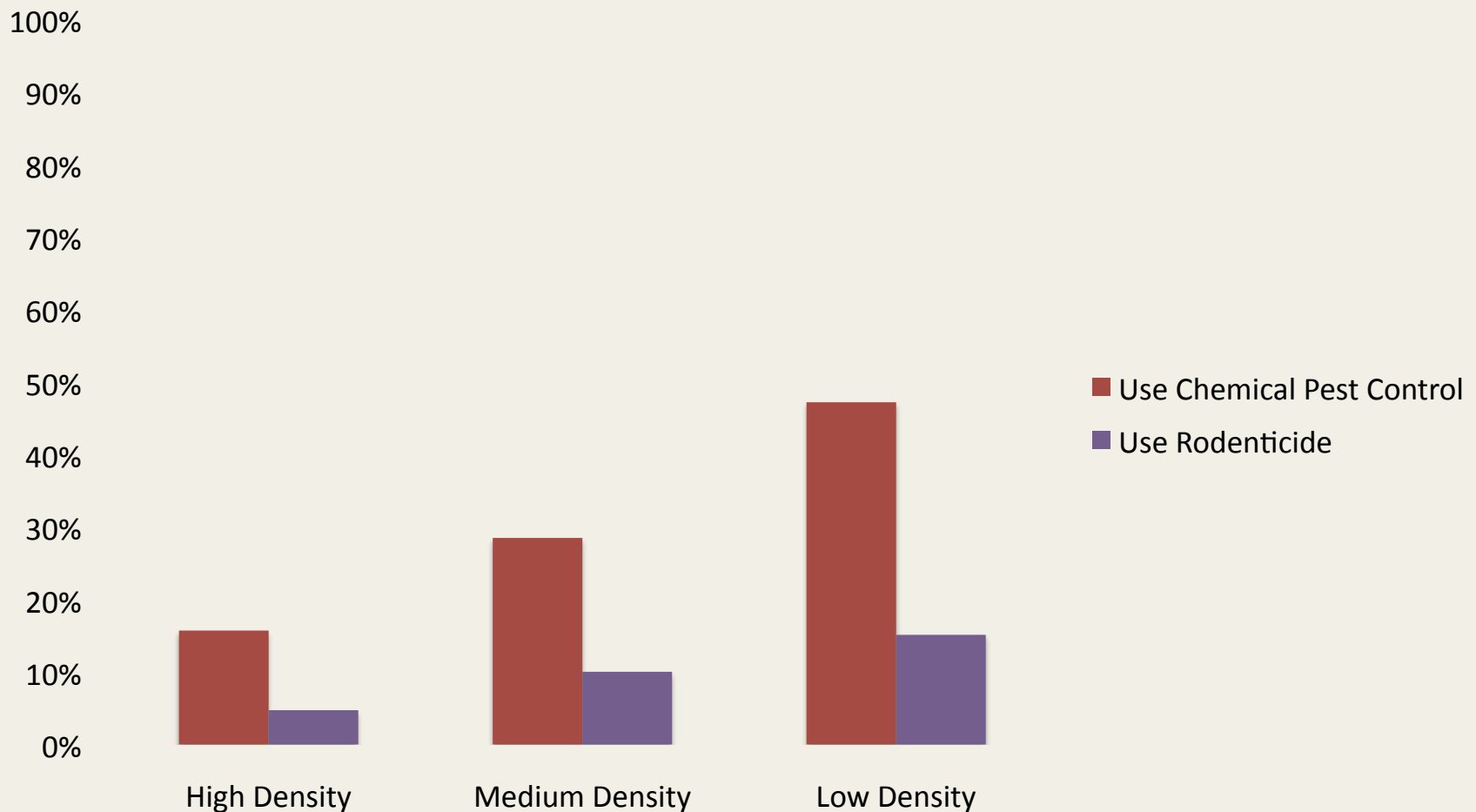


Mean proximity to open space for chemical pest control and non-chemical pest control users

Results – All forms of pest control with housing density

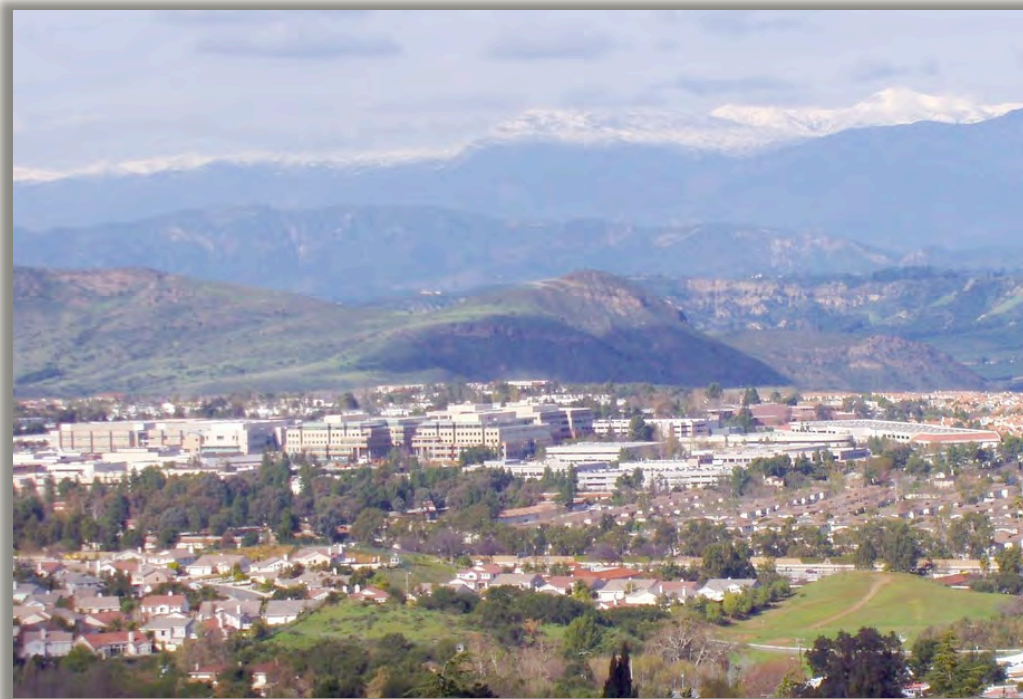


Results – Chemical pest control and rodenticide with housing density

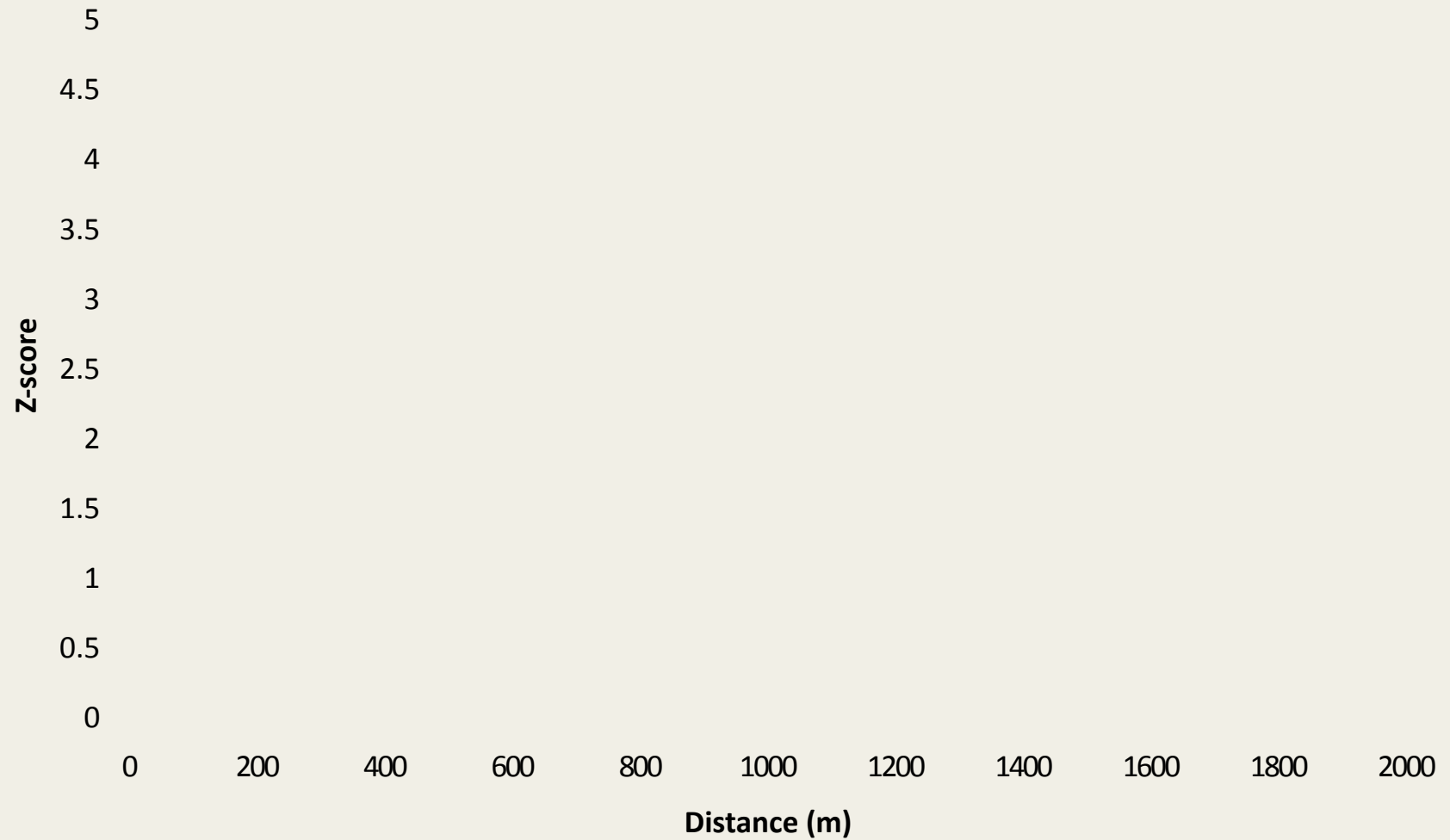


Methods

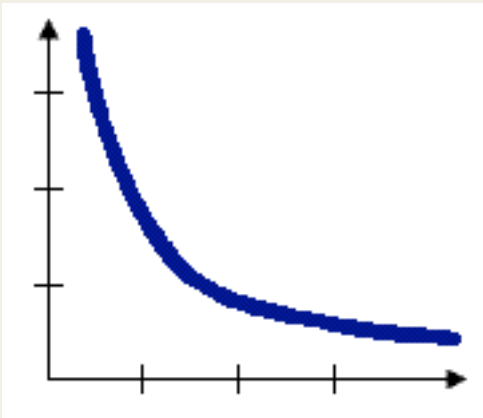
- Moran's I used to quantify spatial auto correlation among survey participants
- Getis-Ord used to test spatial association between pest control and non pest control uses



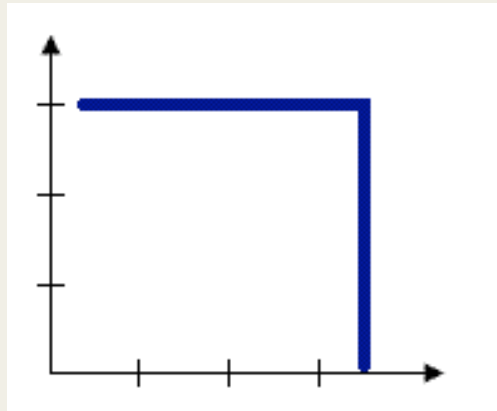
Moran's I at Various Distance



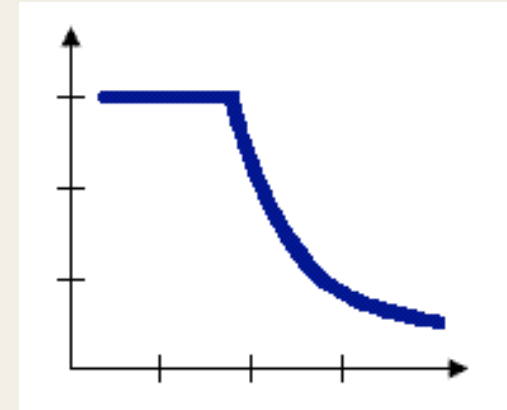
Modeling Spatial Relationships



Inverse distance
weighting

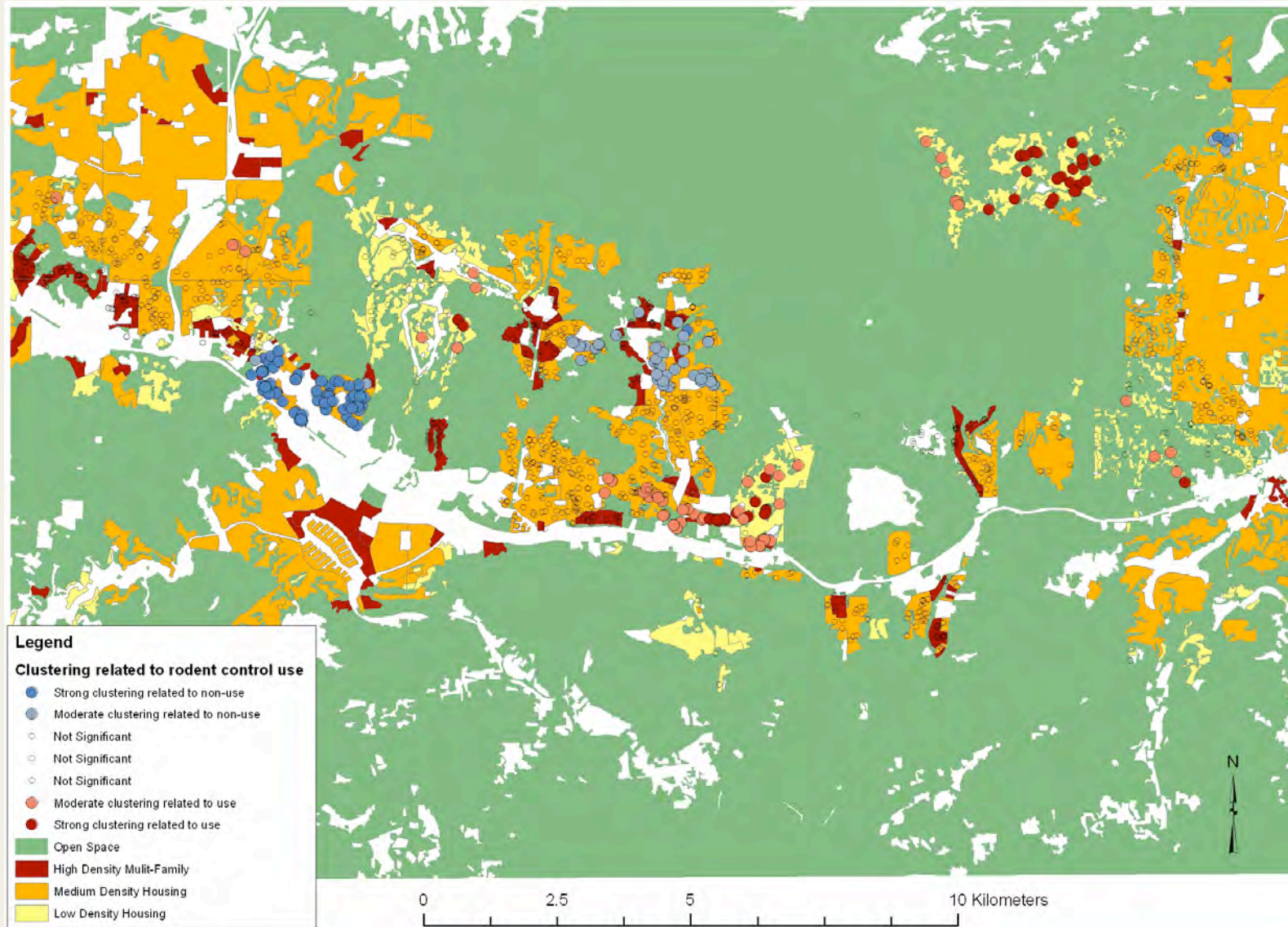


Distance Band



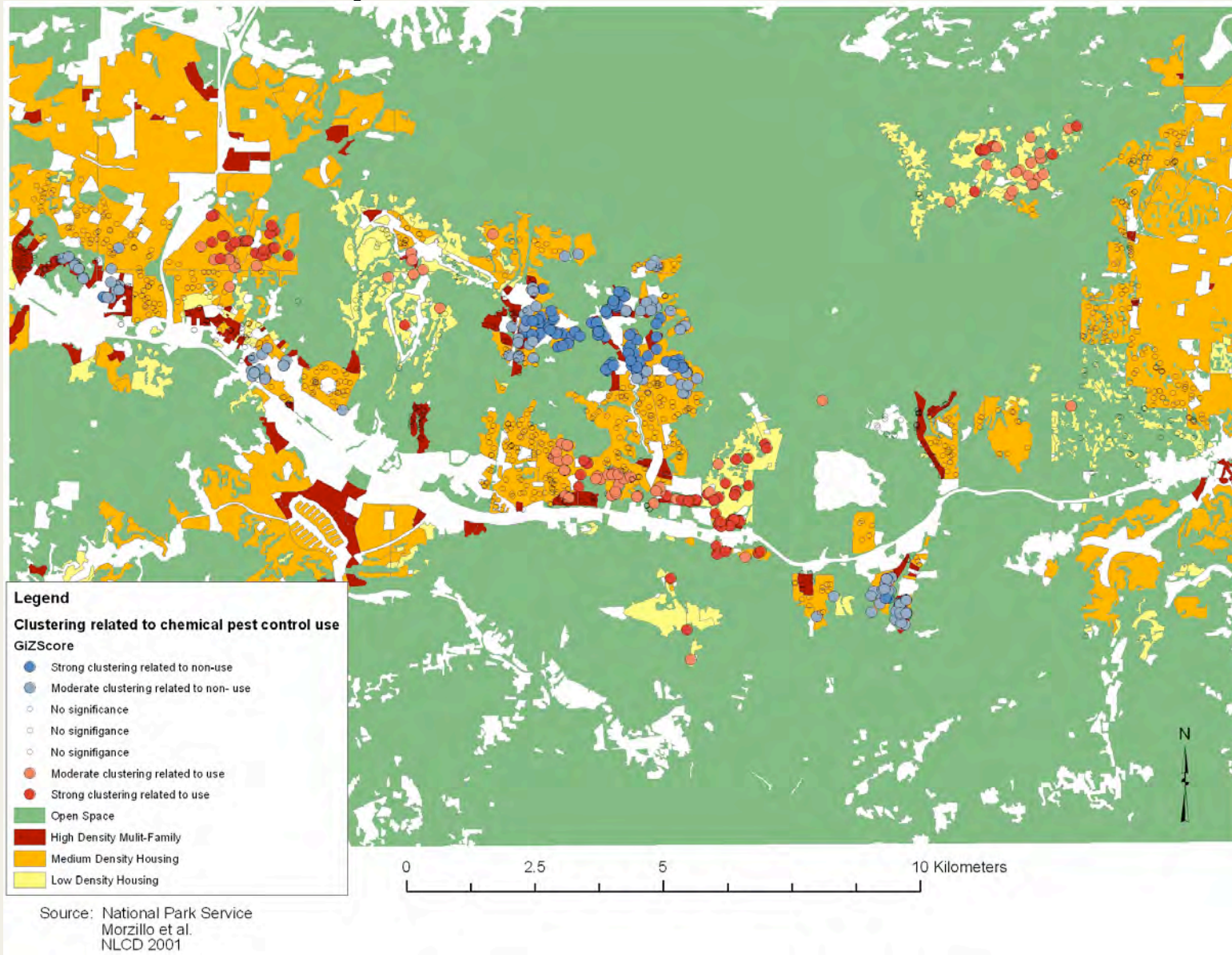
Zone of Indifference

Results – Concentration of pest control use



Source: National Park Service
Morzillo et al.
NLCD 2001

Results – Concentration of chemical pest control use



Discussion

- The relationship between pest control/chemical pest control and open distance is strong at the household scale
- No significant relationship found between rodenticide use and distance to open space
- With regards to structure age, no evidence was found for a relationship between building age and use of pest control.
- There is evidence of an increase in rodent control with a decrease in housing density for all pest control, chemical pest control, and rodenticide use.

Conclusion

- Decrease in housing density and proximity to open space may increase opportunity for pests to utilize resources in or around homes
- Residents may not be able to discern the difference between chemical pest control and second generation rodenticide
- Other reasons for higher use of pest control in low density areas may involve sociological factors such as attitudes toward the environment, education, or income, which were not addressed in this analysis

Questions?

References:

- Fry, J.A., Coan, M.J., Homer, C.G., Meyer, D.K., and Wickham, J.D. (2009) [Completion of the National Land Cover Database \(NLCD\) 1992–2001 Land Cover Change Retrofit product](#): U.S. Geological Survey Open-File Report 2008–1379, 18 p.
- Harrison, R., Bobcats in residential areas: distribution and homeowner attitudes. *The Southwestern Naturalist*, 1998: p. 469-475.
- Riley, S. P. D., Bromley, C., Poppenga, R. H., Uzal, F. A., Whited, L., et al. (2007). Anticoagulant Exposure and Notoedric Mange in Bobcats and Mountain Lions in Urban Southern California. *Journal of Wildlife Management*, 71, 1874-1884.

