Do Builders Consistently Target Forest from 1971 to 1999?

Yujia Zhang, YujiaZhang@Clark.edu, GISDE Masters Program, Clark University
Advisor: Prof. Robert Gilmore Pontius, rpontius@clark.edu, Geography Department, Clark University

INTRODUCTION
The study area is the Plum Island Ecosystems (PIE) LTER research site in northeastern Massachusetts, where the largest land change in recent decades is the transition from Forest to Built. The maps have three categories: Built, Forest and Other. The Other category includes Agriculture, Range, Water, Wetland and Barren. The four time points are 1971, 1985, 1991 and 1999. Transition matrices summarize each time interval. Both the amount and the intensity of the land use transition are analyzed.

METHOD
Intensity of transition is the area of a transition between two categories, divided by the area available for that transition. The intensity of transition is then compared to the uniform intensity. If the intensity of transition is larger than the uniform intensity, we call it “Target”, otherwise, we call it “Avoid”. The uniform intensity is the area of transition divided by the total area available for that transition. At left are examples of equations from 1971 to 1985.

CONCLUSION
- From 1971 to 1999, Forest loses more intensively to Built than to Other.
- Before 1991, Built gains more intensively from Forest than from Other, which indicates that builders targeted Forest before 1991.
- After 1991, Built gains with equal intensity from Forest and Other, which indicates that builders no longer targeted Forest after 1991.

Acknowledgements: The United States’ National Science Foundation (NSF) supported this work via the following programs: Long Term Ecological Research (LTER) via grant DEB-0423565, Coupled Natural Human Systems via grant BCS-0709686, Research Experiences for Undergraduates via grant SES-0494986, and Urban Long Term Research Areas via grants BCS-0948884. NSF supplied additional funding through a supplement grant entitled “Maps and Locals (MALs): A Cross-Site LTER Comparative Study of Land-Cover and Land-Use Change with Spatial Analysis and Local Ecological Knowledge” via grant DEB-0620579. Thanks to the help of Stacy Bogan and Zhenzi Lu. The group Yingyi Yang, Stacy Bogan, Glen Aronson and Yujia Zhang created the computer program to perform the analysis. The Plum island Ecosystems (PIE) LTER research site data is provided by the Human-Environment Regional Observatory (HERO) for this particular presentation.Clark labs facilitate this work by creating the GIS software iLab®.