The New American Ghost Towns

© Justin B. Hollander

Unkempt lawns and crumbling facades are signs of abandonment on this once grand house in Fresno, California.

Justin B. Hollander, Colin Polsky, Dan Zinder, and Dan Runfola

Over the last several years, growing public attention has centered on the fallout from the subprime lending debacle—an unprecedented event that has resulted in massive foreclosures and widespread housing vacancy in what had been the perennially growing Sunbelt (Goodman 2007; Leland 2007). Across the southern United States, from Atlanta, to Fort Meyers, to Phoenix, massive new housing developments are largely unoccupied while older housing is abandoned due to foreclosure. Cities in the Sunbelt now exhibit housing vacancy rates akin to those observed in former industrial Rustbelt cities.

This situation leads to two critical questions: Can Sunbelt cities manage the land use changes that this unstable (and unpredictable) economic market has created, while still maintaining at least the status quo for remaining residents? Are these changes providing new planning opportunities for urban sustainability?

In our work with the Lincoln Institute, we conducted an empirical study to begin to answer those questions (Hollander et al. 2010). The United States Postal Service (USPS) regularly releases datasets that provide information on occupied housing units for each zip code. We were able to obtain household residential delivery data for all zip codes in the lower 48 states for three time periods: the beginning of the real estate boom (February 2000); the peak of the real estate market (February 2006); and a time of high foreclosures and significant decline in real estate markets (February 2009).

The key indicator employed in our study was derived from the USPS dataset: occupied housing units. The USPS data lists how many housing units received mail during a given month in each

zip code. When no one is receiving mail at a location, it is considered vacant. After 90 days of vacancy, the USPS no longer lists the unit as active and, for our purposes, removes it from the occupied housing unit list.

Following a methodology developed by Hollander (2010), we noted changes in occupied housing unit density from one period to the next. It was possible to analyze this because zip code boundaries remained constant in our study sample. We focused on broad shifts in occupancy in a given zip code as being indicative of widespread vacancy and abandonment.

Two time intervals were selected for analysis: February 2000 to February 2006, and February 2006 to February 2009. The first period corresponds with the housing boom years, and the second period with the slowing of the boom into the foreclosure crisis. Change for each time interval and each zip code was calculated by subtracting the total count of households at the end of each interval from the count at the beginning.

Data Tabulation, Mapping, and Analysis

In addition to comparing national indicators of household change between the two periods, each dataset was separated into urban, suburban, and rural areas. Urbanized Areas, as defined by the United States Census, provided boundaries for our urban areas. Areas between the Urbanized Area and the Metropolitan Statistical Area boundary lines were considered suburban, and areas outside of Metropolitan Statistical Areas were considered rural.

For each of these regions and for both time intervals, we analyzed the following factors for both declining and gaining zip codes:

- number of zip codes with a net decline or gain in housing occupancy;
- total square mileage within those zip codes;
- total net housing loss (or gain) for all declining (and gaining) zip codes; and
- percentage of the total housing units lost (or gained) in declining (or gaining) zip codes.

The data were also mapped in three categories to display which zip codes were losing and gaining housing units for each time interval. Zip codes that had a net loss of 30 or more housing units were mapped as "losing," those that gained 30 or more units were mapped as "gaining," and those that lost or gained up to 29 units were considered as having no significant change.

Two measures of spatial autocorrelation—Global Moran's I and a Univariate Local Indicator of Spatial Association (LISA)—were used to explore spatial clustering of USPS's housing

Closed loan offices are a sign of the times in Orlando, Florida.

© Justin B. Hollander

TABLE 1
Summary Statistics for Zip Codes with a Net Decline in Housing Occupancy, 2000–2006

	Total US	Urban	Suburban	Rural
Total Count of Zip Codes	29,026	7,143	13,801	8,082
Square Miles	3,429,778	145,234	1,448,650	1,935,333
Number of Zip Codes with Declining Housing Occupancy	5,656	2,124	1,634	1,924
Percentage of Zip Codes with Declining Housing Occupancy	19.5%	29.7%	11.8%	23.8%

FIGURE 1
2000–2006 Household Delivery Change Analysis Map

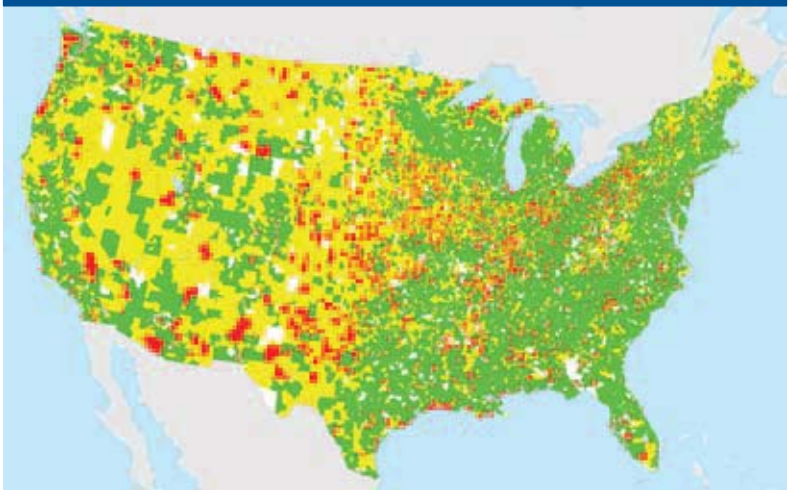
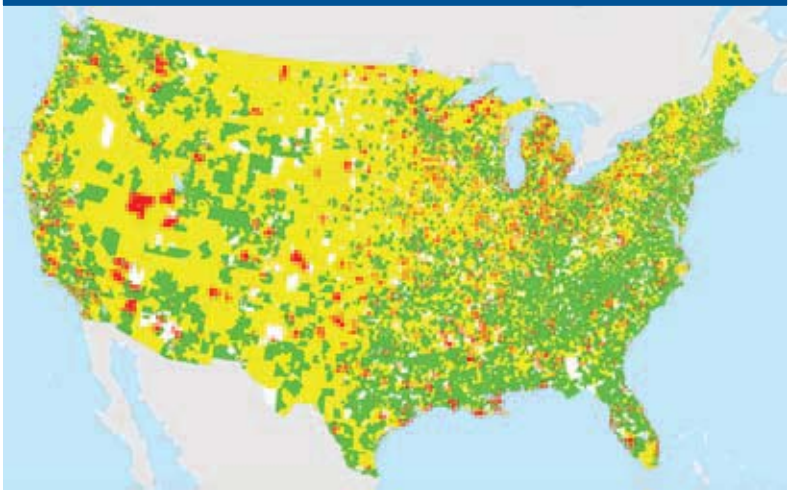


FIGURE 2
2006–2009 Household Delivery Change Analysis Map



Change in Housing Occupancy by Zip Code

- Lost More Than 30 Units
- Change Between –30 and 30 Units
- Gained More Than 30 Units
- No Data

Data source for Figures 1–4: USPS Housing Occupancy Data, 2000–2009.

Note: Some zipcodes were removed from the analysis where data errors existed.

unit occupancy change data and thus identify broad areas that were impacted most severely. In this analysis, the GeoDA software package was used to run the Global Moran's I and Univariate LISA tests, with results shown only for zip code clusters with significance at 0.01 for the Global Moran's I test and 0.05 for the LISA test.

Four possible results are derived from the Univariate LISA test, in which "high change" refers to an increase in housing occupancy of more than 30 units in a zip code and "low change" refers to a decrease of more than 30 housing units.

1. High-high clustering: high change zip codes surrounded by high change zip codes
2. Low-low clustering: low change zip codes surrounded by low change zip codes
3. Low-high clustering: low change zip codes surrounded by high change zip codes
4. High-low clustering: high change zip codes surrounded by low change zip codes

The high-high and low-low results indicate local clustering, while the high-low and low-high results indicate outliers or "islands" (Anselin 1995).

Findings

This analysis of the USPS occupied housing dataset revealed a number of trends that provide a spatial and statistical context for understanding the foreclosure crisis and numerous paths for further investigation. We had anticipated finding significantly more zip codes with a decline in occupied housing in the 2006–2009 period than the 2000–2006 period. Though the latter period did have 16.4 percent more declining zip codes than the former period, this increase was not as high as expected given the assumption of a boom vs. bust comparison.

However, when the dataset was separated into urban, suburban, and rural areas, much more distinctive trends were evident (tables 1 and 2).

TABLE 2
Summary Statistics for Zip Codes with a Net Decline in Housing Occupancy, 2006–2009

	Total US	Urban	Suburban	Rural
Total Count of Zip Codes	28,670	6,949	13,340	8,474
Square Miles	3,400,981	139,771	1,390,027	1,884,710
Number of Zip Codes with Declining Housing Occupancy	6,586	2,084	2,333	2,189
Percentage of Zip Codes with Declining Housing Occupancy	22.9%	30.0%	17.4%	25.8%

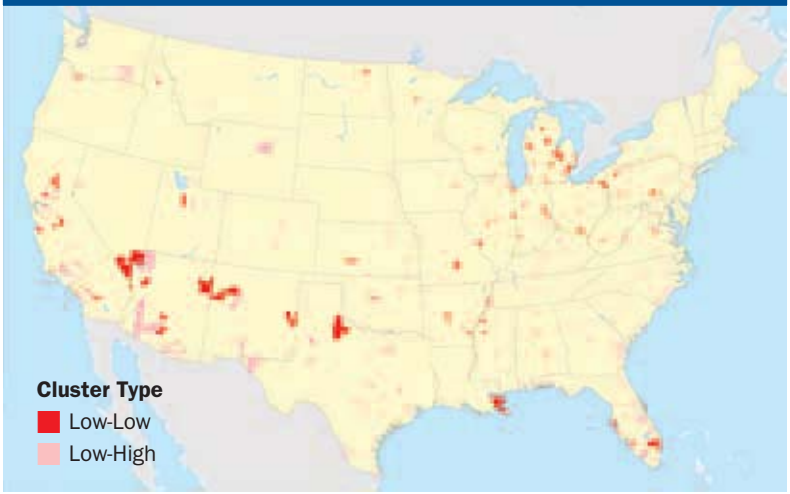
Suburban areas registered 42.8 percent more declining zip codes in the latter (2,333) than the former period (1,634) and rural zip codes registered 13.8 percent more declining zip codes in the latter (2,189) than in the former period (1,924), whereas urban areas had only 1.9 percent fewer declining zip codes in the latter period (2,084 versus 2,124).

Figures 1 and 2 illustrate the occupied housing unit gains and losses during both periods. The 2006–2009 interval was marked not only by an increase in the size and number of declining (red) zip codes but a slowing of growth in many previously expanding areas, as indicated by the increase in no-change (yellow) zip codes in previously expanding regions. Decline also became more prevalent in new areas. The upper Midwestern states (Michigan, Wisconsin, Northern Illinois, and Minnesota) and the Sunbelt region (including Phoenix, Las Vegas, Los Angeles, the San Francisco Bay Area, New Orleans, and the outskirts of Florida's coastal cities) showed noticeable increases in declining zip codes. In contrast, declines in the Great Plains, Mississippi River corridor, western Pennsylvania, and the Pacific Northwest were either less pronounced or reversed in the latter period.

The results of the Global autocorrelation tests indicated spatial clustering existed in the dataset. Not surprisingly, the LISA analysis found declining clusters prevalent in regions that had high percentages of declining zip codes, generally in both intervals (figures 3 and 4). However, it was surprising that fewer low-low (declining) clusters were found in the 2006–2009 period. The 2000–2006 period shows low-low clusters, particularly in the Great Plains states, the Mississippi River corridor, and western New York and Pennsylvania. Despite having more total declining zip codes, less low-low clustering occurred in the 2006–2009 period. However, clustering did occur in new territory including the upper Midwest, South Florida, New Orleans, the Southwest, and California.

FIGURE 3
2000–2006 LISA Analysis Map

FIGURE 4
2006–2009 LISA Analysis Map



Application of the Findings

Since completing the working paper on which this article is based, its findings have influenced further on-the-ground research. Widespread instances of decline in metropolitan areas in the Sunbelt led to

Housing Change

- Lost More Than 30 Units
- Change Between –30 and 30 Units
- Gained More Than 30 Units
- Not in the Urbanized Area

FIGURE 5
Phoenix: Household Delivery Change, 2006–2009

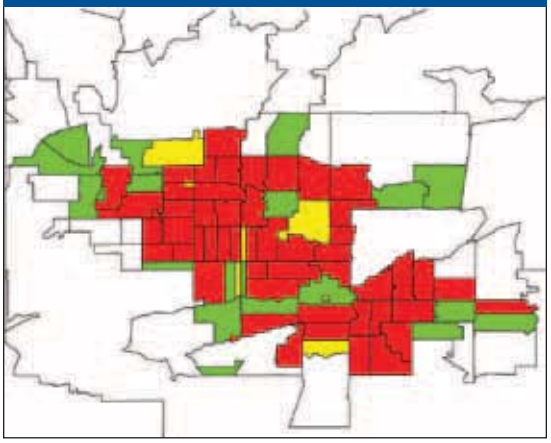
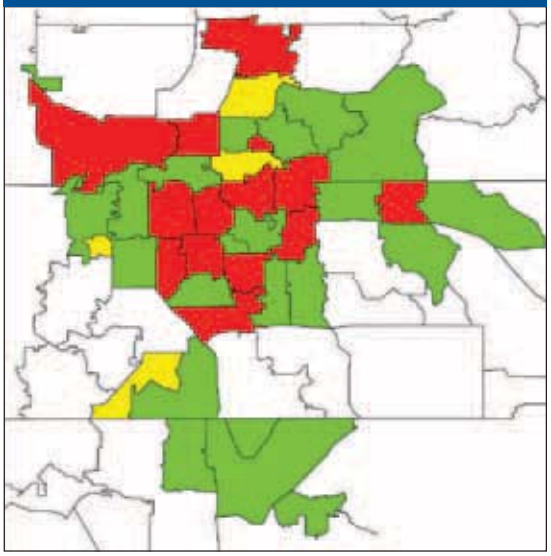


FIGURE 6
Orlando: Household Delivery Change, 2006–2009



Data source for Figures 5–7:
USPS Household Delivery Data, 2006–2009.

more targeted research in cities shown to be among those most severely impacted by the recession of the late 2000s. Three cities are examined as case studies by Hollander (2011): Phoenix, Orlando, and Fresno (figures 5, 6, and 7).

In Phoenix, a fire-hot real estate market led to widespread overbuilding of housing in recent years. Developers converted farms in the Laveen neighborhood into housing subdivisions, in some cases finishing only half of them. In Orlando, inner city neighborhoods that had experienced rebirth in the mid-2000s are stricken by widespread foreclosures today, leading to arson and high vacancy levels. Many of the grand older houses of Fresno are now overrun with weeds and decay as demand for housing has plummeted in this center of California's agricultural industry. With jobs scarce, people are fleeing former boomtowns and leaving behind a new type of vacancy and abandonment. In these cities and others, entire blocks that had been fully occupied now have half or more of the housing stock unoccupied.

Additionally, the number of new declining zip codes found in Metropolitan Statistical Areas in this study raises more specific questions about how the recent recession has impacted different parts of the country. This finding challenges the belief that urban cores are most prone to decline while suburban growth will continue in perpetuity.

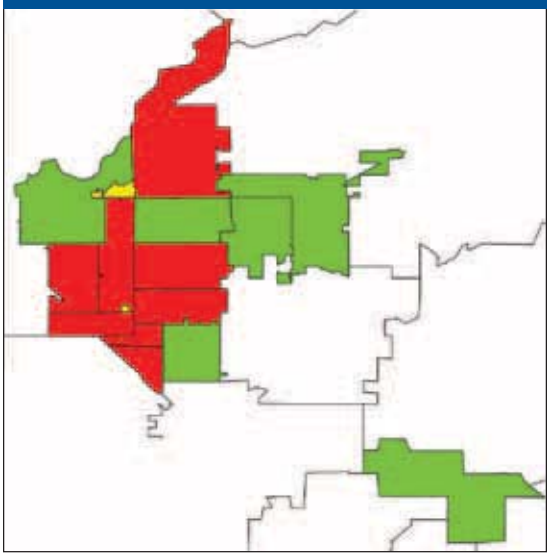
This shift in declining neighborhoods from urban to suburban areas spurred another related study that broke metropolitan regions down into central cities, inner ring suburbs, and outer ring suburbs (Zinder 2010). It used statistical metrics to compare trends within those subsets of the metropolitan region and added another round of evidence that suburban decline is becoming more pervasive in most regions of the country.

Zinder found more new declining zip codes in all suburban regions during the recent recession than in the previous period and determined that outer ring suburbs sustained the largest increase of new zip codes with a net decline in housing occupancy. In contrast, the total number of declining zip codes in central cities decreased. This study also provided additional support for the regional trends reported here showing particularly deep impacts in southwestern cities and outer ring suburbs in the Midwest, South, and Northeast.

Concluding Remarks

The findings from this research effort indicate that the face of declining cities and regions in America has begun to change. Though many areas previously hit by economic downturns have continued to feel their impacts, decline is no longer limited primarily to older manufacturing towns, urban cores, and declining rural farming communities. Places that had prospered in more recent times, including Sunbelt cities and remote suburbs, have begun to see declines in occupied housing stock as well and were, in fact, the places hit hardest by the

FIGURE 7
Fresno: Household Delivery Change, 2006–2009



subprime lending crisis. It is important to note that housing abandonment (i.e., a drop in occupied housing unit density) is one manifestation of neighborhood change, but it is only part of a larger story of metropolitan growth and decline. We focus here on those neighborhoods in decline, but in the future we will be attuned to growing neighborhoods as well.

Our research located some statistically significant clusters of zip codes experiencing home abandonment in recent years. The next question to answer is: What social processes and factors explain this clustering? In future phases of this research, we plan to examine how changes in occupied housing density have been dispersed throughout major Census-defined Urbanized Areas and begin to employ advanced multivariate statistical techniques to understand the key attributes associated with clusters of decline.

Should current trends persist in years to come, planners and policy makers will need to be better prepared, perhaps by looking to models adopted by other communities to build upon existing assets while embracing population decline. Understanding these complex dynamics will help community leaders come to terms with the challenges their cities and regions face. This article provides an introduction to a methodological approach to identify these trends in nearly real time to help quantify impacts on a given zip code, city, or region.

ABOUT THE AUTHORS

JUSTIN B. HOLLANDER *is an assistant professor in the Department of Urban and Environmental Policy and Planning at Tufts University in Medford, Massachusetts, and a research scientist at the George Perkins Marsh Institute at Clark University in Worcester, Massachusetts. Contact: justin.hollander@tufts.edu*

COLIN POLSKY *is an associate professor at the Graduate School of Geography and associate dean for Undergraduate Research & Active Pedagogy at Clark University. He is a geographer specializing in the human dimensions of global environmental change. Contact: cpolsky@clarku.edu*

DAN ZINDER *is a recent graduate of masters degree program in Urban and Environmental Planning at Tufts University. His research interests include land use policy, declining cities, GIS, and sustainability. Contact: dan.zinder@gmail.com*

DAN RUNFOLA *is a Ph.D. student at Clark University. His research interests include remote sensing, GIS, land change science, and vulnerability. Contact: drunfola@clarku.edu*

ACKNOWLEDGMENTS

Many thanks go to Nick Giner (*nginer@clarku.edu*) for his contributions to the spatial autocorrelation analysis used in this research. Much of the methodological explanation is based directly on his work on the spatial distribution of lawns in Massachusetts.

REFERENCES

Anselin, Luc. 1995. Local indicators of spatial autocorrelation–LISA. *Geographical Analysis* 27:93–115.

Goodman, Peter S. 2007. This is the sound of a bubble bursting. *The New York Times.* December 23.

Hollander, Justin B. 2010. Moving towards a shrinking cities metric: Analyzing land use changes associated with depopulation in Flint, Michigan. *Cityscape: A Journal of Policy Development and Research* 12(1):133–151.

Hollander, Justin B. 2011. *Sunburnt cities: The great recession, depopulation, and urban planning in the American Sunbelt*. London/New York: Routledge.

Hollander, Justin, Colin Polsky, Dan Zinder, and Dan Runfola. 2010. The new American ghost town: Foreclosure, abandonment, and the prospects for city planning. Working Paper. Cambridge, MA: Lincoln Institute of Land Policy.

Leland, John. 2007. Officials say they are falling behind on mortgage fraud cases. *The New York Times.* December 25.

Zinder, Daniel H. 2010. *Through the rings: A study of housing occupancy declines across major urbanized areas in the United States.* Medford, MA. Tufts University.