CHAPTER 14

HOUSING AFFORDABILITY AND POPULATION CHANGE IN THE UPPER MIDWESTERN NORTH WOODS1

ROGER B. HAMMER AND RICHELLE L. WINKLER

INTRODUCTION

The rate of change in rural society in the United States and other developed countries has increased in recent decades as new communications and transportation technologies, migration processes, and economic restructuring have contributed to the “urbanization” of rural communities. Migration from urban areas into the countryside (counterurbanization) and increasing residential and commercial development within rural areas (exurbanization) have served as important avenues through which rural neighborhoods have experienced profound change (Robinson, 1990); yet, little is known about the economic, cultural, and political impacts of these changes (Nelson, 2001). Rising housing values and the deterioration of housing affordability for low to moderate income residents in rural host communities constitute just one possible unintended consequence of such counterurbanization/exurbanization. This chapter examines the effects of counterurbanization and exurbanization on housing affordability in a predominantly rural, natural amenity-rich region of the United States—the North Woods of Minnesota, Wisconsin, and Michigan.

Historically, rural areas in the United States have been heavily dependent on extractive and manufacturing industries that have declined as sources of stable employment and reasonable earnings during the last several decades due to changes in technology, declining demand, and international competition (Galston & Baehler, 1995). In response to this decline, leisure and recreation services have grown in economic importance in many rural areas. North Americans increasingly relate to nature primarily as a “place of leisure,” and rural landscapes have become more valuable as recreation resources than as sources for raw material production inputs; rural space itself has become a commodity (Whitson, 2001). Consequently, many rural communities have shifted economic development
efforts away from traditional industries and toward service and amenity-based activities (Fawson et al., 1998; Frederick, 1993; Glasgow, 1990). Amenity-based development offers a niche for rural communities in a changing global economy in which they benefit from, and contribute to, idyllic visions of nature and rural space (Whitson, 2001). Tourism and recreation-promotion are increasingly used as community development strategies to rejuvenate local economies in rural areas throughout the United States. In attractive rural areas, new developments entice tourists, seasonal residents, in-migrants, and/or retirees to the area, and in this way, the rural experience, rather than raw materials, becomes the export mechanism (Rothman, 1998).

In the rural North Woods of Minnesota, Wisconsin, and Michigan, natural-amenity-based tourism, especially seasonal home development around lakes, has long been a source of local development. Many rural communities have initiated amenity-based economic development strategies in order to attract tourists, migrants, and businesses from more urban areas, yet little is known about the economic, cultural, and political impacts of this type of development (Nelson, 2001). In addition to the recognized benefits, such as population, employment, and earnings growth (Deller et al., 2001), tourism- and recreation-based development can also impose substantial costs (Marcouiller & Green, 2000; Power, 1996). One such cost may be that long-time residents are priced out of housing markets as housing demand increases. Power notes that "vacation homes and other tourism developments tend to drive up property values and the cost of living, driving out existing residents" (1996, p. 216). As Whitson explains, "the influx of outside money and population . . . is precisely what creates economic growth. . . . The result is that new developments are often priced beyond what people working in the local economy, or at least the old local economy, can afford" (2001, p. 150). In describing the social and economic changes generated by counterurbanization in amenity-rich areas, the popular press evokes images of "Aspenization" ruining previously rural communities (see Gates & Pryor, 1993; Janofsky, 1999). This study examines the relevance of these claims in a predominantly rural, natural-amenity-rich region, the North Woods of the U.S. Midwest.

Lack of quality, affordable housing is a critical issue facing many rural communities in the United States (Ziebarth et al., 1997). Housing is an important aspect of a local community’s social structure, with numerous sociological implications. In addition to fulfilling basic human needs for shelter, it influences multiple aspects of individuals’ lives, including employment opportunities, social status, education, health, family composition, and psychological well-being (Mutcher & Krivo, 1989). On a broader scale, housing conditions have been linked to the economic development and social well-being of neighborhoods, communities, and, by extension, the nation as a whole (Green & Malpezzi, 2000; Ziebarth, 2000). Affordability has become the central housing problem facing the United States as overcrowding has declined and substandard housing has been upgraded or replaced (Bogdon & Can, 1997; Bratt, 2002; Dolbeare, 1999). The percent of income

that low and moderate income (LMI) households spend on housing costs affects their ability to provide other basic needs such as food, clothing, transportation, and health care. Housing affordability constitutes an important social equity issue and a critical indicator of general family and community well-being.

In this chapter we examine two aspects of amenity-based development and their influence on housing affordability in the rural North Woods. First, natural-amenity-led growth necessarily involves a migration process in which population is redistributed from urban to rural areas and urban populations move from larger to smaller places (Berry & Gillard, 1977; Dahms & McComb, 1999). This migration pattern, termed counterurbanization, represents the social transformation of a rural community. Second, economic development entails commercial and residential development, termed exurbanization, which represents the physical transformation of rural landscapes into a low-density, nebulous zone (Marx, 1964), not urban or suburban, but also no longer rural. Although counterurbanization and exurbanization have been associated with a variety of social, cultural, economic, and environmental effects, community conflicts have been most visible—and often most contentious—around affordable housing issues (Whitson, 2001). This research both furthers our sociological understanding of the socially and physically transformative processes of counterurbanization and exurbanization and, in a practical sense, offers rural communities pursuing amenity-based development information concerning the potential consequences.

THE NORTH WOODS STUDY AREA

The North Woods is an ecologically and culturally contiguous region that encompasses the northern tier of Minnesota, Wisconsin, and Michigan. Known for its forests and lakes, the region has a long history of attracting tourists and seasonal homeowners each summer who seek natural amenities, recreation, and escape from Chicago, Milwaukee, Minneapolis/St. Paul, Detroit and other nearby cities. Because the culture and economy have long been tied to the physical characteristics of the landscape through forestry and recreation, we define the rural “North Woods” for the purposes of this study in ecological terms based on pre-settlement vegetation. Ecologically, the region popularly referred to as the North Woods is known as the Laurentian Mixed Forest province (Atwood, 1940). It encompasses approximately the northern half of Minnesota and Wisconsin, as well as Michigan’s Upper Peninsula and approximately one third of its Lower Peninsula. The metropolitan areas of Minneapolis-St. Paul, Milwaukee-Waukesha, Duluth-Superior, Eau Claire, Wausau, Green Bay, Appleton-Neenah-Oshkosh, Sheboygan, Grand Rapids, and Saginaw all fall, at least partially, within the Laurentian Mixed Forest province. We exclude the two largest of these metropolitan areas (Minneapolis-St. Paul and Milwaukee-Waukesha), as well as the three Wisconsin counties (Manitowoc, Ozaukee, and Sheboygan) that extend from Milwaukee to Green Bay in a narrow band along Lake Michigan. These
Neighborhoods of the North Woods

Studies of housing affordability tend to examine national, state, or county patterns and trends over time (Belden & Wiener, 1999; “Housing Assistance Council,” 2002), yet housing markets are very local in nature (Ziebarth et al., 1997). Housing availability, household incomes, and housing costs vary significantly across space, and aggregate studies cannot detect important localized variation in housing affordability. To capture variation in counterurbanization and housing affordability across space, this study uses rural “neighborhoods” in the rural North Woods as the unit of analysis.

Neighborhoods can be defined in many different ways. Bogdon and Can (1997), in a study of housing affordability in a metropolitan area, defined their neighborhood unit of analysis as the Census block group, which includes up to 3,000 persons (with an optimum population of 1,500 (U.S. Census Bureau, 2003). In urban areas, block groups encompass a relatively small land area and represent homogeneous neighborhoods reasonably well. However, because block groups are an aggregation based at least in part on population criteria, rural block groups encompass much larger land areas and may include multiple “neighborhoods.” For example, one rural block group might encompass either a small town or several small towns and the surrounding rural township, including different housing conditions and migration patterns. Block groups are not always coextensive with municipalities and urbanized areas, especially in rural areas. For block groups that are divided by a municipal, boundary, or congressional district boundary, the decennial census provides tabulations for the block group as a whole and for each part. All else being equal, household and personal characteristics within constituent parts of a block group would be more homogeneous than in the block group as a whole.

We use these “partial” block groups as the representation of rural “neighborhoods” in our study in order to improve geographical and statistical precision relative to using data for complete block groups.

Rural Areas of the North Woods

Just as there are different approaches to defining neighborhoods, there are different approaches to defining “rural.” The Federal government essentially delineates “rural” from “urban” on two different scales. The Office of Management and Budget (2004) categorizes counties as metropolitan based on population size (i.e., a city with a population of 50,000 or an overall county population of 100,000) and secondarily on the commuting exchange with more populous adjacent counties. The Census Bureau categorizes census blocks as urban or rural based on population density and location. Urban areas are generally comprised of a cluster of blocks or block groups with a population of at least 1,000 persons per square mile, surrounding blocks with a population of at least 500 persons per square mile, and less densely settled blocks that form enclaves or indentations or that connect discontiguous urban areas (U.S. Census Bureau, 2003). We use both these scales to delineate the “rural” North Woods. First, we include all partial block groups in nonmetropolitan counties in the region. Second, since metropolitan counties in the region include substantial rural territory, we include all neighborhoods in metropolitan counties that are defined as rural by the U.S. Census Bureau and are located more than 30 miles from the metropolitan area’s population center. St Louis County in Minnesota illustrates why rural portions of metropolitan counties must be included in our analysis. It’s county seat, Duluth, makes the county metropolitan, but the county itself extends far north of Duluth to the Canadian border and encompasses portions of the extremely remote Boundary Waters Canoe Area Wilderness and the rural communities scattered along its well-known eastern access, the Gunflint Trail.3

COUNTERURBANIZATION IN THE NORTH WOODS

As described in the introduction, counterurbanization is a process in which population is redistributed from more urban to more rural areas. Counterurbanizing areas undergo a variety of social and economic changes. Research suggests that counterurbanization engenders gentrification-like outcomes, increasing demand for housing in rural neighborhoods, driving up housing costs, and exacerbating housing affordability problems for LMI households (Shucksmith, 1991; Spain, 1993; Whitson, 2001). We expect that counterurbanization will increase housing cost burden for LMI households.

We measure counterurbanization as the percent of the rural neighborhood’s 2000 population over the age of five that moved into the neighborhood from a metropolitan area during the previous five-year period (1995–2000). For...
the rural neighborhoods located within a metropolitan county, we used the percent of in-migrants from both a central city (generally with a population of 50,000 or more) within the same metropolitan area and those from a different metropolitan area. Counterurbanization is widespread across the rural North Woods, especially in the Lower Peninsula of Michigan and the Minnesota/Wisconsin border area between the Minneapolis-St. Paul and Duluth-Superior Metropolitan Areas. It occurs less in central Wisconsin, most of Michigan’s Upper Peninsula, and northwest and west central Minnesota.

EXURBANIZATION IN THE NORTH WOODS

Amenity-based development results in residential and commercial construction that transforms the rural landscape in a process of exurbanization. We measure exurbanization as the number of housing units constructed in each neighborhood of the rural North Woods during the 1990s and use housing growth as a viable proxy for the overall exurbanization process, given the lack of data on other types of land development across the region. In the neoclassical economic model, new housing construction should increase supply, reduce housing prices, and subsequently reduce LMI housing cost burden. However, the supply of housing in many rural areas experiencing amenity-based development may not meet the heightened current demand. Under such conditions, housing developers seeking to maximize profits may choose to build more expensive new homes with higher internal rates of return (Myers, 2000). In this scenario, higher-income households demand new housing, middle-income households compete for a small supply of well-maintained older housing (driving up prices), and LMI households are left with disproportionately older and/or less well-maintained housing and/or are forced to incur cost burden (Thompson & Mikesell, 1981).

Across the rural North Woods, exurbanization is more spatially focused than counterurbanization. Large expanses of the region, especially in far north and northeast Minnesota and the eastern Upper Peninsula of Michigan experienced very low housing growth during the 1990s (less than 4 percent). Exurbanization was more concentrated in the western two-thirds of Michigan’s Lower Peninsula, whereas counterurbanization encompassed more territory. Although counterurbanization was strong in the lake areas spanning the Wisconsin/Michigan border, exurbanization was not as extensive. However, central Wisconsin experienced exurbanization much more than counterurbanization. Finally, the southern portion of Minnesota’s rural North Woods exhibited similar levels of both counterurbanization and exurbanization. The Wisconsin neighborhoods along the Minnesota border experienced high levels of population influx from metropolitan areas, which is not surprising given the proximity of Minneapolis-St. Paul, but
While counterurbanization and exurbanization are closely related processes, in the North Woods, they are spatially different.

HOUSING AFFORDABILITY IN THE NORTH WOODS

Over the past several decades, as housing quality improved and overcrowding declined, affordability became the predominant housing problem confronting rural households in the United States, as housing costs in many rural areas increased faster than incomes (Housing Assistance Council, 2002). During the 1990s, housing costs in nonmetropolitan areas grew considerably faster (59 percent) than in metropolitan areas (39 percent). Much of this increase has been attributed to increased demand from migration to nonmetropolitan counties, or what we term counterurbanization (Marcouiller et al., 2002; Mathur & Stein, 1991; Wills, 2002). Studies have demonstrated that population growth in rural areas is related to increasing housing costs and property taxes (Bennett, 1996; Marcouiller et al., 2002; Nelson, 2001). While real household income of homeowners in the nonmetropolitan Midwest grew 16.4 percent in the 1990's, constant-quality housing prices rose 55.2 percent (Wills, 2002).

Approximately one quarter of the 23 million nonmetropolitan households in the United States spend more than 30 percent of their gross income on housing and therefore incur a cost burden and lack affordable housing as defined by the Federal government. The U. S. Department of Housing and Urban Development considers households with incomes at or below 80 percent of the median income of the county in which they reside as low to moderate income. Cost-burdened LMI households are eligible for Federal housing assistance programs.

In this study, we emulate the Federal standard for housing affordability: a household at or below 80 percent of county median income (LMI) spending 30 percent or more of its income on housing. To compare housing affordability across the entire rural North Woods, we use the regional median household income instead of the county-level median in our definition of cost burden. This modification of the Federal definition of housing cost burden does not alter the neighborhood scale of our analysis but does broaden the extent, enabling us to compare neighborhoods across the region rather than solely within single counties. Thus, LMI households are defined as households with gross incomes of less than $35,000 during 1999, the calendar year prior to the census. In the rural North Woods, 488,230 or 48 percent of all households were LMI, and 128,864 or 13 percent experienced housing cost burden in 1999.

Mapping housing costs allows us to delineate the spatial variation that occurs within the North Woods region and to identify sub-regions where high housing costs tend to cluster. While the majority of rural neighborhoods in the region have relatively low housing costs, areas bordering metropolitan counties and areas with natural amenities have high median home values that resemble values in metropolitan areas. Housing is much less affordable in a band of communities adjacent to the Minneapolis-St. Paul Metropolitan Area, in the Wisconsin River Valley of central Wisconsin just south of the Wausau Metropolitan Area, and in east central Wisconsin adjacent to the Green Bay Metropolitan Area. In these areas, median income households would be unable to afford a median-priced home in the neighborhood. Housing is similarly unaffordable in inland lake recreation districts across the rural North Woods, including the Brainerd Lakes area in the north-central part of Minnesota, the Hayward/Lac Courte Oreilles area in northwest Wisconsin, and the Northern Highlands Lake District of north central Wisconsin and extending into the Upper Peninsula. Housing values in several Great Lakes coastal areas are also high, especially in the boundary waters of far northern Minnesota, on the Door County, Wisconsin peninsula jutting into Lake Michigan, and the entire area in an around the Leelanau Peninsula that forms the Grand Traverse Bay of Lake Michigan.

Collectively, these maps illustrate problems with assessing housing affordability in terms of counties, states, or regions. Because housing markets are localized in space and restricted by employment opportunities and personal relationships, and because housing costs and household incomes vary drastically across space, a more localized and spatially-informed view of housing affordability is necessary to understand the nature of the problem in rural areas.
Although more spatially dispersed than either LMI households or affordable housing, LMI housing cost burden is not randomly distributed across the rural North Woods. The proportion of LMI households that experience housing cost burden is significantly spatially autocorrelated with a Moran’s $I = 0.1107$, $p \geq 0.001$. As noted in chapter 19 on spatial demography, Moran’s $I$ is similar to the familiar Pearson correlation coefficient, except that rather than measuring the value similarity of two characteristics for single observations, it measures the value similarity of a single characteristic in neighboring observations. The level of housing cost burden in a given neighborhood is quite similar to the level in adjacent neighborhoods. This spatial clustering further disadvantages LMI households experiencing cost burden. If cost burden was spatially distributed in a random pattern, LMI households would be more likely to secure an affordable housing unit by simply moving to an adjacent unit. Due to the spatial clustering of cost burden, LMI households moving to nearby neighborhoods are likely to encounter a similar lack of affordable housing and thus continue to incur cost burden. Combined with the larger geographic size of rural neighborhoods, the quest for affordable housing might necessitate relatively long-distance moves for LMI households which increase the likelihood of disrupting employment, education, and social support.

### ANALYSIS AND FINDINGS

We estimated a relatively parsimonious weighted least squares model of housing affordability across the rural North Woods that included the factors described above, along with several control variables. We weighted the 6,909 observations in the analysis based on the number of households in the neighborhood to prevent less populous neighborhoods from having a disproportionate effect on the results. The preponderance of LMI households and the rate of homeownership are important influences on housing affordability in rural neighborhoods and need to be considered in conceptual and statistical model development. Research in rural areas, including the Midwest, has attributed the lack of affordable housing to the prevalence of LMI households rather than to high housing costs (Dolbeare, 1999; Krofta et al., 1999). Low income restricts a household’s capacity to secure affordable housing; very low income households may not be able to afford even the lowest-cost, market-rate housing. Therefore, neighborhoods with a prevalence of LMI households will experience relatively high rates of housing cost burden.

Homeownership is also an important determinant of housing affordability. Homeownership reduces housing cost burden, as renters are more likely to suffer housing affordability problems than homeowners (Belden & Wiener, 1999; Dolbeare, 1999). Because renters generally have lower incomes and do not build equity through loan amortization and appreciation, as do homeowners, they are more likely to pay over 30 percent of their household income—a standard household budget benchmark—for housing. Over time, housing costs incurred by homeowners are not as subject to inflation as rental expense, considerably reducing the relative incidence of cost burden among LMI homeowners. The incidence of LMI cost burden in the rural North Woods (18 percent) is low compared to national rates (25 percent), in part because rural North Woods residents predominantly own their homes. In 2000, 80 percent of the region’s households owned their own home, compared to 66 percent nationally. This high rate is partially attributable to traditionally low housing costs for rural areas in the Midwest region in general (Krofta et al., 1999). However, a higher percentage of homeowners (14.1 percent) in the rural North Woods face housing cost burden than in the Midwest (11.4 percent) and the nation as a whole (13.0 percent).

Using these two control variables, the proportion of neighborhood households that are LMI, and the proportion of households that own their own home, we modeled the influence of counterurbanization and exurbanization on LMI housing affordability. We define counterurbanization as the percentage of the 2000 population that moved into the neighborhood from a more urban area between 1995 and 2000, and exurbanization as the growth of housing units in the neighborhood between 1990–2000 expressed as a percentage of housing units in the neighborhood in 1990. The model explains nearly 40 percent ($R^2 = 0.3963$) of the variance in the proportion of LMI households experiencing cost burden in neighborhoods of the rural North Woods. Jointly, the control variables explain nearly 37 percent ($R^2 = 0.3685$) of the variance. Although counterurbanization and exurbanization explain less than 3 percent of the variance after controlling for the percentage of households that are LMI and the percentage of homeowners, they contribute significantly to the fit of the model according to both the adjusted $R^2$ and the Akaike Information Criterion. F-tests also indicate that a model that includes counterurbanization and exurbanization either jointly or individually fits the data significantly better than a model with only the control variables. Moreover, the coefficient for each of the variables in the model was highly statistically significant ($p \leq 0.001$), and the sign of each coefficient was in the expected direction.

### Table 14.1. Model of Housing Cost Burden

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-Value</th>
<th>Standardized Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMI</td>
<td>0.315</td>
<td>0.008</td>
<td>38.73</td>
<td>0.449</td>
</tr>
<tr>
<td>Owners</td>
<td>-0.133</td>
<td>0.007</td>
<td>-19.82</td>
<td>-0.226</td>
</tr>
<tr>
<td>Counterurbanization</td>
<td>0.153</td>
<td>0.013</td>
<td>13.03</td>
<td>0.118</td>
</tr>
<tr>
<td>Exurbanization</td>
<td>0.072</td>
<td>0.007</td>
<td>10.54</td>
<td>0.104</td>
</tr>
<tr>
<td>Intercept</td>
<td>11.095</td>
<td>0.851</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
According to the model, a change in the composition of a neighborhood, in which an additional 10 percent of households have incomes at or below 80 percent of the regional median, would result in an additional 3 percent of LMI households experiencing housing cost burden. A concomitant increase of 10 percent in homeownership in a neighborhood would improve housing affordability, resulting in an additional 1.33 percent of the neighborhood’s LMI households spending less than 30 percent of their income on housing. However, counterurbanization, the proportion of persons moving into a neighborhood from a more urban area, can have a greater impact on LMI housing affordability than homeownership. Given two similar neighborhoods, if 5 percent of the residents in the first neighborhood recently moved in from a more urban area, while 10 percent had done so in the second neighborhood, 1.53 percent more of the LMI households in the second neighborhood would incur a housing cost burden. This represents slightly more than the difference produced by a similar proportional decline in homeownership and just under half the change associated with a similar proportional increase in LMI households. Although the impact of exurbanization is considerably lower than other variables, and just over half that of counterurbanization, housing construction during the 1990s equal to 10 percent of the neighborhood’s housing units in 1990 results in an additional 0.72 percent of LMI households experiencing cost burden. Although this difference might seem negligible, it demonstrates that exurbanization-driven growth, which is widely perceived as a positive development for rural communities, imposes costs on economically vulnerable households. The finding that housing growth in the rural North Woods contributed to the lack of affordable housing for LMI households rather than increase supply and ease housing affordability has important public policy implications.

CONCLUSIONS

Migration from urban areas into the countryside (counterurbanization) and increasing residential development in rural areas (exurbanization) have served as important avenues through which rural neighborhoods have experienced profound change. One consequence of such change, however, is rising housing values, which, in turn, affect housing affordability. Counterurbanization significantly affects LMI housing cost burden in neighborhoods of the rural North Woods, as does exurbanization to a lesser extent. The results of this study suggest that rural community development and planning efforts should consider impacts on housing affordability that amenity-based development strategies engender. They also indicate that increasing residential development in rural areas does not generally meet the housing needs of LMI households and, in fact, reduces housing affordability.

These findings have important implications for community development planners and affordable housing advocates, as LMI households may face severe affordable housing problems when confronted with an influx of migrants from urban areas and housing growth. Communities, experiencing counterurbanization and exurbanization, especially communities with high concentrations of low- and moderate-income households, should be aware of the need to provide affordable housing in the wake of population change. Planners should recognize these risks and devise plans for mediating the negative impacts of urbanization in host communities. Fortunately, the nature of this counterurbanization/exurbanization problem affords these communities considerable advantages for addressing housing needs of LMI households compared to rural communities in which affordable housing problems stem from long-term decline and neglect. Along with more diffuse advantages of an increasing tax base and vibrant economy, these communities may be able to harness the forces of counterurbanization and exurbanization and ameliorate negative impacts on housing affordability by adopting inclusionary zoning, a relatively new tool being used by increasing numbers of rapidly growing municipalities. Inclusionary zoning reverses the tendency of traditional zoning regulations to exclude affordable housing due to minimum lot-size standards and multi-family housing restrictions by establishing “mandatory set-asides” or minimum percentages of new housing units that must be affordable to households at a particular income level (Burchell & Galley, 2000). By definition, in communities experiencing counterurbanization/exurbanization new housing units are being constructed, thus providing the community with the capacity to produce a relatively permanent stock of affordable housing units provided by the private market. Moreover, to maintain long-term affordability and reduce administrative oversight, inclusionary zoning units are most often owner occupied. As demonstrated by this study, home ownership in and of itself reduces housing cost burden among low- and moderate-income households. In this way, inclusionary zoning programs can deliver a “one-two punch” to housing affordability problems in rural neighborhoods experiencing counterurbanization/exurbanization by both providing affordable housing and promoting homeownership.

The lack of in-migrant characteristics remains an important limitation of this study. Because income levels of in-migrants are not tabulated in these data, it remains unclear whether counterurbanization introduces low-income migrants who exacerbate poverty and increase demand for low-income housing or if in-migrants are relatively well-off financially and demand higher-quality housing, raising housing costs. The two processes may occur in different neighborhoods according to different temporal and spatial trajectories and have different effects on housing affordability. Subsequently, additional work using characteristics such as income of in-migrants to rural areas could be conducted to further examine the relationships between counterurbanization, gentrification, and housing cost burden.

As Federal and state governments in the United States review the efficacy of affordable housing programs, it is important that policy-makers understand the extent of housing cost burden in rural areas as well as in urban centers. Planners, policy-makers, and housing advocates can benefit from the fine-grained statistical and cartographic analysis provided by this study. Both housing service providers...
and policy-makers should have access to precise and detailed maps portraying the extent of housing cost burden by neighborhood in order to allocate resources to the problem more effectively.

ENDNOTES

1. The authors would like to acknowledge the very helpful comments of Gary P. Green, Paul R. Voss, Susan I. Stewart, and two anonymous reviewers. We also acknowledge data acquisition assistance from Daniel L. Veroff and the University of Wisconsin Applied Population Laboratory and Volker C. Radeloff and the University of Wisconsin Spatial Analysis for Conservation and Sustainability Laboratory, as well as the editorial and bibliographical assistance of Tracy Schmid. This research was funded by the USDA Forest Service North Central Research Station (00-JV-11231300-055). Earlier versions of this chapter were presented at the 10th International Symposium for Society and Resource Management in Keystone, CO, June, 2004, and at the Annual Meeting of the Rural Sociological Society in Montreal, July, 2003. The authors appear in alphabetical order and authorship is shared equally.

2. The USDA’s Economic Research Service identifies recreational counties using indicators of recreational activity, including: 1) the percentage of employment in the entertainment and recreation, accommodations, eating and drinking places, and real estate sectors; 2) the percentage of wage and salary income in the same sectors; and 3) the percentage of housing units intended for seasonal or occasional use.

3. The rural Northwoods encompass 7,359 partial block groups. The census did not determine housing costs in 450 of these neighborhoods due to limited number of renter and/or owner households, forcing us to exclude those observations from our analysis. Since excluded neighborhoods had higher percentages of both LMI and renter households when compared with neighborhoods that are included in the analysis, this exclusion could be expected to bias our estimates downward for the regional rate of housing cost burden to a marginal extent. However, there is no reason to believe that these excluded neighborhoods systematically differ from other neighborhoods in other respects, and therefore this exclusion should not affect the results of our analysis.

4. We estimate the regional median income by calculating the household-weighted average of the county median income of all counties that are included in whole or in part in the rural North Woods. For the metropolitan counties that we partially include in the rural North Woods, the median income includes both the rural neighborhoods that are part of the study and the urban neighborhoods that we exclude.

5. Calculated as the weighted mean of the county median income of each county in the North Woods region.

6. The spatial autocorrelation of LMI housing cost burden necessitates caution in selecting an appropriate analytical approach. Spatial autocorrelation results in the violation of the independent and identically distributed assumption of standard statistical methods and can cause bias and/or inefficiency in analyses of spatially-aggregated data (Anselin, 1988). In the case of positive spatial autocorrelation, that is neighboring value similarity rather than dissimilarity, the value similarity among neighboring observations reduced variance and the estimates of standard errors, exaggerating the statistical significance of the results. Including independent variables in a model that, at least partially, explain the spatial relationships of the dependent variable can serve to reduce the influence of spatial autocorrelation on the results. The success of this analytical strategy can be tested by calculating the Moran’s I statistics for the residuals of the model and, if spatial autocorrelation persists, employing spatial regression techniques to alleviate such effects.

7. We also estimated more complex models that controlled for natural amenities, recreational activity, and the supply of affordable housing but found no significant improvement in the model’s explanatory power.

8. Our definition of housing cost burden (a household must be both LMI and spend 30 percent or more of income on housing costs) is expected to exaggerate the explanatory power of LMI in the model.

REFERENCES


