Development of a Special Methodology for
Assessing Affordable Housing Inventory in Polk County, IA

Phase II Report

July 15, 2013

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Study Overview

The primary impetus for this study is the hypothesis that existing housing needs assessments do not fully capture either the existing affordable housing supply or affordable housing need in Polk County. Therefore the primary research question asks: To what extent does the existing supply of affordable housing in Polk County match with the existing need for affordable housing?

This study assesses a range of data sources toward the development of a more comprehensive inventory of the affordable housing market in Polk County, IA. From the assessment we will propose a methodology for cost-effective, periodic inventory, and test the methodology using several neighborhoods within the study area.

Phase II

Phase II spanned from January – June 2013. This was the most intensive data gathering phase of the project and researchers focused in particular on the challenge of identifying existing rental units in Polk County and on implementation of the qualitative component of the study. This document provides an update regarding these efforts and reports preliminary results from our ongoing analysis.

Preliminary Findings

Our study adopted the conventional practice of defining rent affordability as a situation in which a household spends no more than 30 percent of their gross annual income, including utilities, on rent. There is considerable debate about the validity of this method, but it is still the primary metric used by HUD and most housing needs assessments. As such, it provides a baseline measure that can be compared to other methods and other places.

Our preliminary analysis shows that for the majority of the census tracts in Polk County, households pay less than 30% of their income on rent, which means that households are not rent burdened. (See map on page 2). Based on HUD guidelines, we consider households rent burdened if they are paying more than 30% of their income toward rent and extremely rent burdened if they are paying more than 50% of their income toward rent. On the following map, yellow, orange, and red census tracts are experiencing rent burden. Based on this analysis, 28 census tracts show rent burden with seven falling near or beyond the severely rent burdened threshold. Households in the northern half of Des Moines are more likely to be rent burdened than those in the south and the most rent burdened household are located in the northeastern corner of the city. We did not have data for two census tracts.

Percentage of income spent on rent by census tract (Polk County)
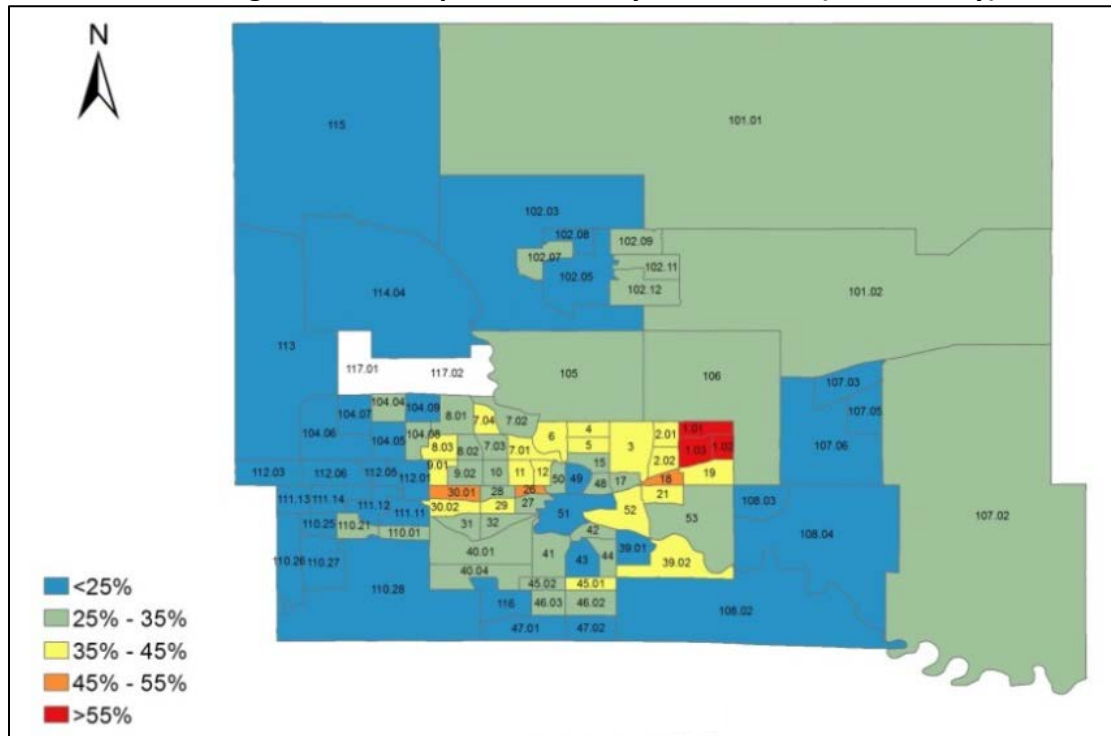
Source: US Census Bureau, 2013

In Polk County, most of the housing units that would be affordable to low income households are located within the City of Des Moines. Most of these tracts are located in the city's urban core, although several are distributed across the western half of the city. The largest concentration of high cost rental units is located in West Des Moines.

Median gross rent by census tract, Des Moines, Iowa

A potential drawback of the traditional measures of affordability is that this measure fails to take other household expenses into account. Some households may not be able to afford to spend 30% of their income on rent due to high costs in childcare, food, or medical expenses while others may choose to live further from work to find cheaper housing only to spend more on transportation. To address these expenses, we used the "residual income" approach to calculate another estimate of affordability across the county, as proposed by Stone (2006) at the University of Massachusetts, Boston. This approach posits that a home is only affordable if a household can afford to pay rent after paying for their other necessary living and sustaining expenses. To calculate typical monthly expenses in Polk County, we used MITs living wage calculator. See the results below. Assumed housing costs are highlighted.

Typical monthly expenses, Polk County, Iowa

Monthly Expenses	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Food	$242	$357	$536	$749	$444	$553	$713	$904
Child Care	$0	$521	$967	$1,412	$0	$0	$0	$0
Medical	$119	$408	$434	$416	$272	$399	$376	$386
Housing	$506	$737	$737	$944	$604	$737	$737	$944
Transport-ation	$306	$595	$686	$736	$595	$686	$736	$748
Other	$65	$163	$220	$293	$119	$155	$176	$202
Monthly income after taxes	$1,238	$2,781	$3,580	$4,550	$2,034	$2,530	$2,738	$3,184
Annual income after taxes	$14,856	$33,372	$42,960	$54,600	$24,408	$30,360	$32,856	$38,208
Annual taxes	$3,252	$7,293	$9,402	$11,941	$5,344	$6,654	$7,187	$8,351
Annual income pre-taxes	$18,108	$40,665	$52,362	$66,541	$29,752	$37,014	$40,043	$46,559

Living wage calculation for Polk County, Iowa

Hourly Wages	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Living Wage	$8.71	$19.55	$25.17	$31.99	$14.30	$17.80	$19.25	$22.38
Poverty Wage	$5.21	$7.00	$8.80	$10.60	$7.00	$8.80	$10.60	$12.40
Minimum Wage	$7.25	$7.25	$7.25	$7.25	$7.25	$7.25	$7.25	$7.25

**Percentage of affordable units by census based on residual income method
(Assuming area median income for renters, household size of 2)**

Data source: US Census (American Community Survey 2010 5-year estimates).

When considering housing affordability in light of residual income, the geography of housing affordability in the county changes considerably. The map above shows the results of our residual income analysis, indicating the number of units affordable to the median renter household in Polk County (a 2-person household making $30,864 annually, which can afford to pay $254 in rent after household expenses are subtracted). This map confirms that access to affordable housing is not distributed equally across the region. Large areas of Polk County have no affordable units and in only 5 tracts are more than 15% of the units affordable.

While much of the Phase II research focused on measuring demand, supply and affordability of existing housing units, a final component focused on indentifying the barriers that individual households face in their efforts to find affordable housing. The first step of this research was the implementation of a countywide survey that asked respondents details about the affordability and conditions of their housing as well as household demographics.

Our survey is made up of a randomly selected sample of 2,000 of the approximately 180,000 households located in Polk County. The first round of surveys was sent out in early June and a reminder post card was mailed out approximately 10 days later. Finally, a second survey was mailed out to non respondents at the end of June and as of July 5th we had received approximately 340 completed responses. We need at least 383 responses to guarantee 95% confidence in our results with a 5% margin of error, so any findings at this point must be interpreted with caution.

Respondents who feel they are paying too much for housing, by income

A total of 26% of our respondents from across the region indicated that they feel they are paying too much for their housing. While 85% of respondents indicated that their housing is adequate for their needs and the needs of their families, 15% of respondents feel that their current housing is somehow inadequate. The figure below shows the most common issues that respondents indicated caused their housing to be inadequate. The sum of these percentages exceeds 15% because some respondents indicated multiple complaints. Complaints in the "other" category include housing that is too large or poorly designed.

Non-price related housing issues
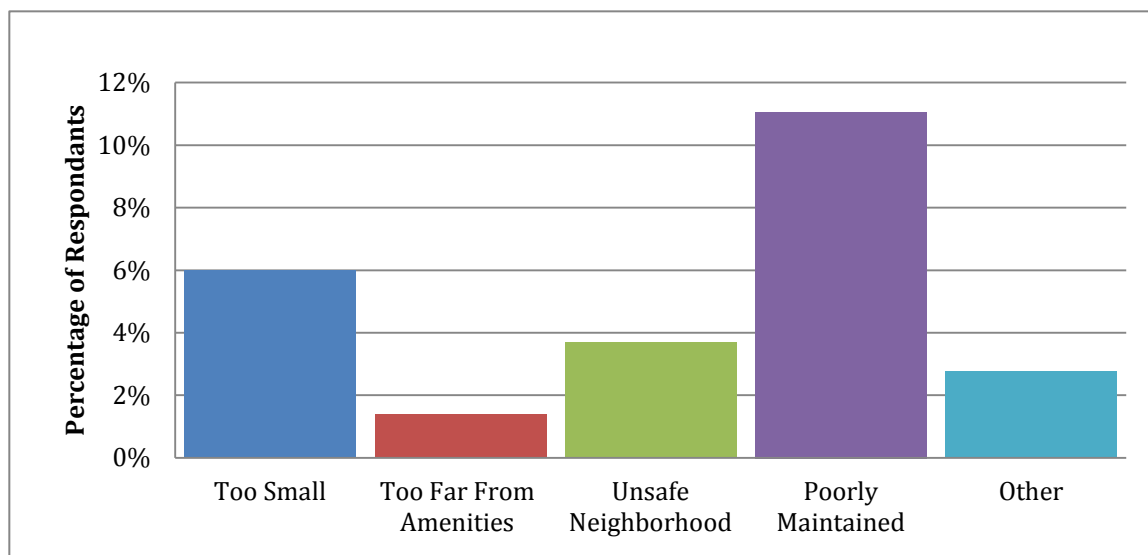
Ongoing Data challenges

We found a significant discrepancy between the number of rental units in the six largest jurisdictions in Polk County as counted by the US Census and the number of rental units in these jurisdictions as counted by their rental inspectors. This discrepancy was the largest in the City of Des Moines, where the Census identified approximately 30,000 fewer rental units than the city's rental inspection database. We are still in the process of explaining this discrepancy: however, in the meantime we are relying on census data.

We had hoped to create a more accurate count by comparing the MidAmerican Energy list of account holders and addresses with the County Assessor's homeowner information for a given address and then identifying addresses where the contact name differed between the two lists. We would then assume that a different name meant the property was a rental property. Unfortunately, MidAmerican Energy was unable to provide us with their records. We may be able to pursue data from other utilities to fill this gap in our data. In the meantime, we will continue to use census and inspection data.

We continue to find a methodology for calculating residual income that more closely resembles the current cost of living for households in Polk County. Conversely, we will continue to try and explain how household that show negative residual income based on our models are making ends meet and how those struggles impact their ability to find and maintain affordable housing.

Next Steps

Phase III of the study will span from July 2013 – June 2014. The work for the third and final phase will include the following:

- Finalization and testing of housing affordability and availability models
- Interviews of housing challenged households
- Finalization of analysis of affordable housing barriers
- A historical investigation of regional planning in Des Moines
- An empirical verification of factors impacting rental housing affordability

Findings of the study are expected to provide a deeper understanding of gaps in the availability of affordable housing in Polk County. It is our intention that these findings will inform the Polk County Housing Trust Fund and local policy makers in their efforts to design policies to address the issue of fair and affordable housing in Des Moines and the Polk County region.

PROJECT OVERVIEW

The primary impetus for this study is the hypothesis that existing housing needs assessments do not fully capture either the existing affordable housing supply or affordable housing need in Polk County. Therefore the primary research question asks: To what extent does the existing supply of affordable housing in Polk County match with the existing need for affordable housing?

This study assesses a range of data sources toward the development of a more comprehensive inventory of the affordable housing market in Polk County, IA. From the assessment we will propose a methodology for cost-effective, periodic inventory, and test the methodology using several neighborhoods within the study area.

PHASE II OVERVIEW

Objectives

Phase II spanned from January – June 2013. This was the most intensive data gathering phase of the project and researchers focused in particular on the challenge of identifying existing rental units in Polk County and on the implementation of the qualitative component of the study.

The research team established the following objectives for Phase II:

- Continued data gathering of rental housing supply
- Continued investigation of affordable housing geographies within Polk County
- Model development and testing
- Implementation of county wide housing affordability survey
- Data collection for fair housing analysis
- Data collection for network analysis of affordable housing field
- Research plan established for investigation of the relationship between the absence of a regional agency in the Greater Des Moines Area and the distribution of affordable housing
- Research plan established for empirical verification of factors impacting rental housing affordability

Upon completion of this phase, the research team anticipated moving into data analysis and dissemination of the findings for the third and final phase of the project.

Work Plan

The work plan for Phase II of this study was divided into four subareas: geographies of affordable housing; rent models; affordability as a function of rent, utilities, and home-work transport costs; and housing barriers and unmet needs.

1. Geographies of affordable housing. This subarea expanded on the project's previous work identifying geographies of affordable housing in Polk County. This work focused on the identifying the number and location of affordable rental units in Polk County, and included the following research tasks:

- Evaluate parcel level data and spatial correlates with other data (demographics, transit routes, other housing units)
- Use measures of clustering and spatial autocorrelation to infer rents/numbers of units, etc, when none are available.

2. Rent models. For the second subarea, the research team investigated statistical models that would impute rents and affordability in Polk County where data is insufficient or unavailable. This work included the following research tasks:

- Identify appropriate statistical models from the literature
- Use available data to evaluate the use of these models to impute rents where actual rents are unknown

3. Affordability as a function of rent, utilities, and home-work transport costs. Rent or mortgage payments are only part of the cost of living. The location of affordable housing with respect to work and other opportunities affects travel costs, which in many cases can be a significant portion of the total cost. This subarea considers the affordability of existing units in terms of other household expenses such as transportation and utilities. The work for this subarea included the following research tasks:

- Estimate home-work transport costs based on employment locations relative to residency (develop origin-destination cost table).
- Estimate utility costs based on HUD/census data or other sources
- Aggregate cost model

4. Housing barriers and unmet needs. This section of the study uses a housing affordability survey as well as interviews and other tools of qualitative inquiry to investigate the barriers to affordable housing experienced by low-income households in Polk County. The work for this subarea included the following research tasks:

- Identify fair housing trends in the region
- Investigate the institutional network of affordable housing provider
- Implement a housing affordability study to Polk County residents

**PHASE II ACCOMPLISHMENTS: GEOGRAPHIES OF AFFORDABLE HOUSING/RENT AND
COST MODELS**

For the second phase of this study, the research team completed the data collection from the secondary data sources we identified in Phase I and conducted preliminary analyses. Table 1 shows the variables and the anticipated public and private data sources including.

Table 1: Variables and Data Sources

Variable	Data Source
Child care cost by household size	Iowa Policy Project
Food cost by household size	US Dept. of Agriculture, Iowa Policy Project
Free & reduced lunch program participation	Iowa Dept. of Education
Gross rent	US Census, apartment search websites
Gross rent as percent of monthly income	US Census
Household income	US Census
Household size	US Census
Income tax rates	State of Iowa
Location of employment	Economic Census
Location of occupied rental units	Rental inspection agencies, gas utilities, apartment search websites
Mortgage rate	Freddie Mac
Number of occupied rental units	US Census, Rental inspection agencies, gas utilities
Number of vacant rental units	US Census
Other household necessities cost	Consumer Expenditure Survey, Iowa Policy Project
Primary school test scores	Iowa Dept. of Education
Property tax rates	City of Ankeny
Transportation costs	Consumer Expenditure Survey, Iowa Policy Project

One important accomplishment from this phase was the creation of a database containing rental property data from the rental inspection agencies in six of Polk County's seven largest cities: Altoona, Ankeny, Clive, Des Moines, Urbandale, and West Des Moines. Iowa state law only requires these inspections in cities with more than 15,000 residents. The only city with a population over 15,000 that was not included in the database was Johnston. Because they just recently passed the population threshold, they had not yet put a rental inspection code into place.

A comparison of census estimates of rental units with the inspections database revealed different counts of rental units in each of the 6 jurisdictions (see Table 2). This data includes

many rental units that are seemingly not captured by the 2010 American Community Survey (ACS) or the U.S. Census. While the 2010 Census counted 49,328 rental units in the six cities for which we collected inspection data, and the 2010 ACS counted 46,694, rental inspection agencies list 85,097 registered rental units. The greatest underestimate by far occurs in Des Moines, where inspectors count 34,881 more units, or roughly 2.2 times as many units as the census estimate. Other cities show only small differences, within roughly 1,000 units of the census count. Clive and Urbandale's inspectors list fewer units than the Census estimate, with the other three cities recording roughly 6 to 13 percent more units. Overall, inspectors list 73% more units than the census estimated, illustrating that the census and ACS may be underestimating the quantity of rental units throughout the county.

Table 2: Difference between ACS, census, and inspector rental count data for six Polk County cities

City	2010 ACS	2010 Census	Inspector Data	Difference (Insp-Census)	Percentage Change
Altoona	1,249	1,360	1,439	79	**5.8%**
Ankeny	3,266	3,863	4,256	393	**10.2%**
Clive	1,230	1,254	1,179	- 75	**-6.0%**
Des Moines	29,611	30,290	65,171	34,881	**115.2%**
Urbandale	3,069	3,374	2,642	-732	**-21.7%**
WDM	8,269	9,187	10,411	1,224	**13.3%**
Total	**46,694**	**49,328**	**85,097**	**35,769**	**72.5%**

The data used in Table 2 has some limitations that may contribute to this phenomenon. The most recent census data available is from 2010, and rental inspection data was collected in early 2013, allowing for 3 years of growth. This may explain differences in the rapidly growing suburban communities of West Des Moines and Ankeny, where it is possible that hundreds of rental units were added. In Des Moines, rental properties must be inspected every three years. If a rental property is sold and becomes owner-occupied, the inspection's office will not learn about it until they contact the property owner to update their certificate of inspection.

Figure 1 shows the distribution of rental properties by census tract based on the inspections data from the county's 6 largest cities. Figure 2 shows the difference between the census data and inspections data, again by census tract. Although, as seen in Table 2, the highest concentrations of undercounting by the census occur in Des Moines, undercounting by the census exists across the region.

Figure 1: Count of rental units in Polk County from rental inspection data[1]
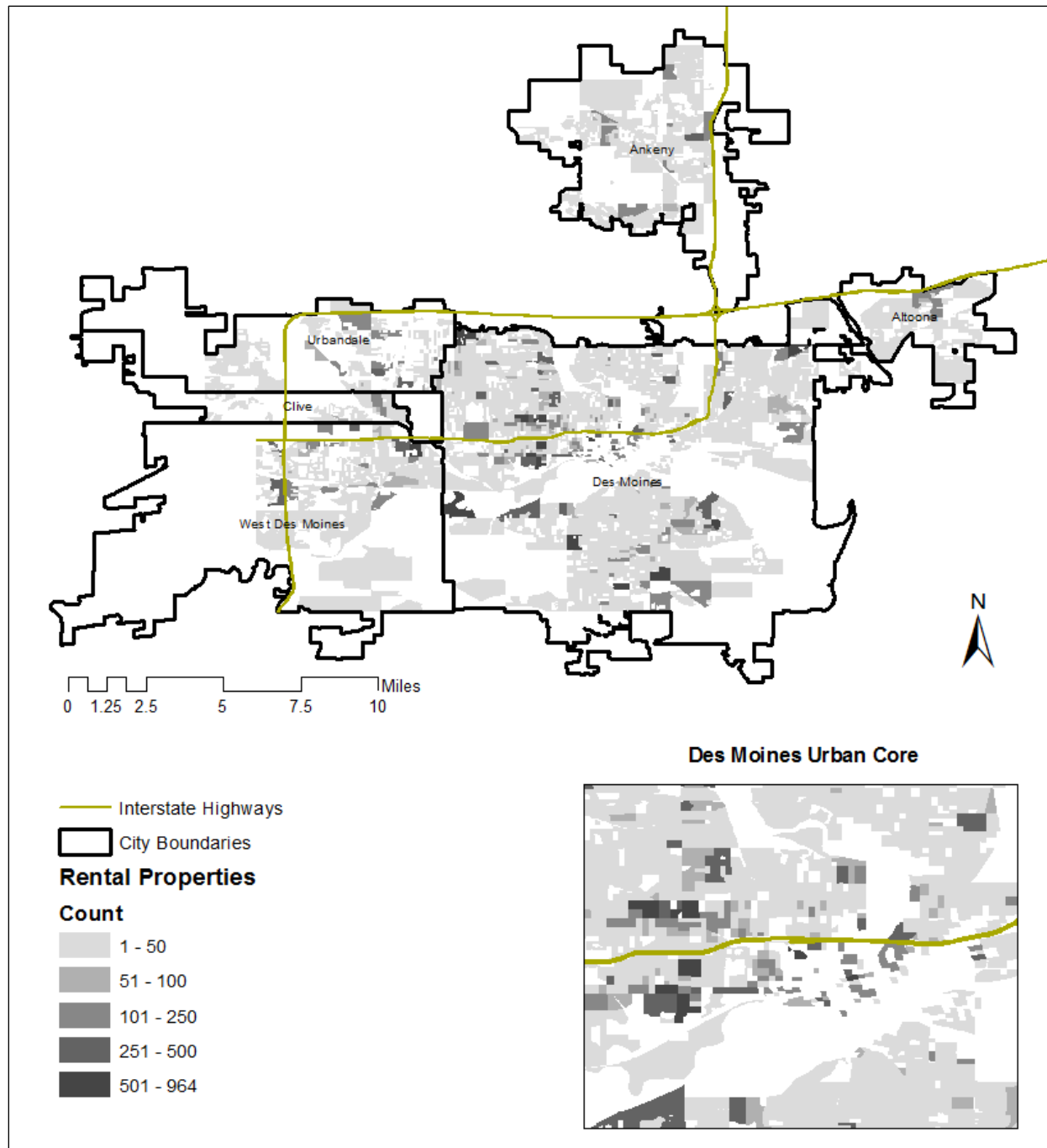
Source: City of Altoona, City of Ankeny, City of Clive, City of Des Moines, City of Urbandale, City of West Des Moines, Polk County GIS, US Census Bureau (2010)

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[1] Due to recording errors, some addresses (roughly 5% of total) could not be geocoded properly, which may cause underestimates of the number of units in some blocks.

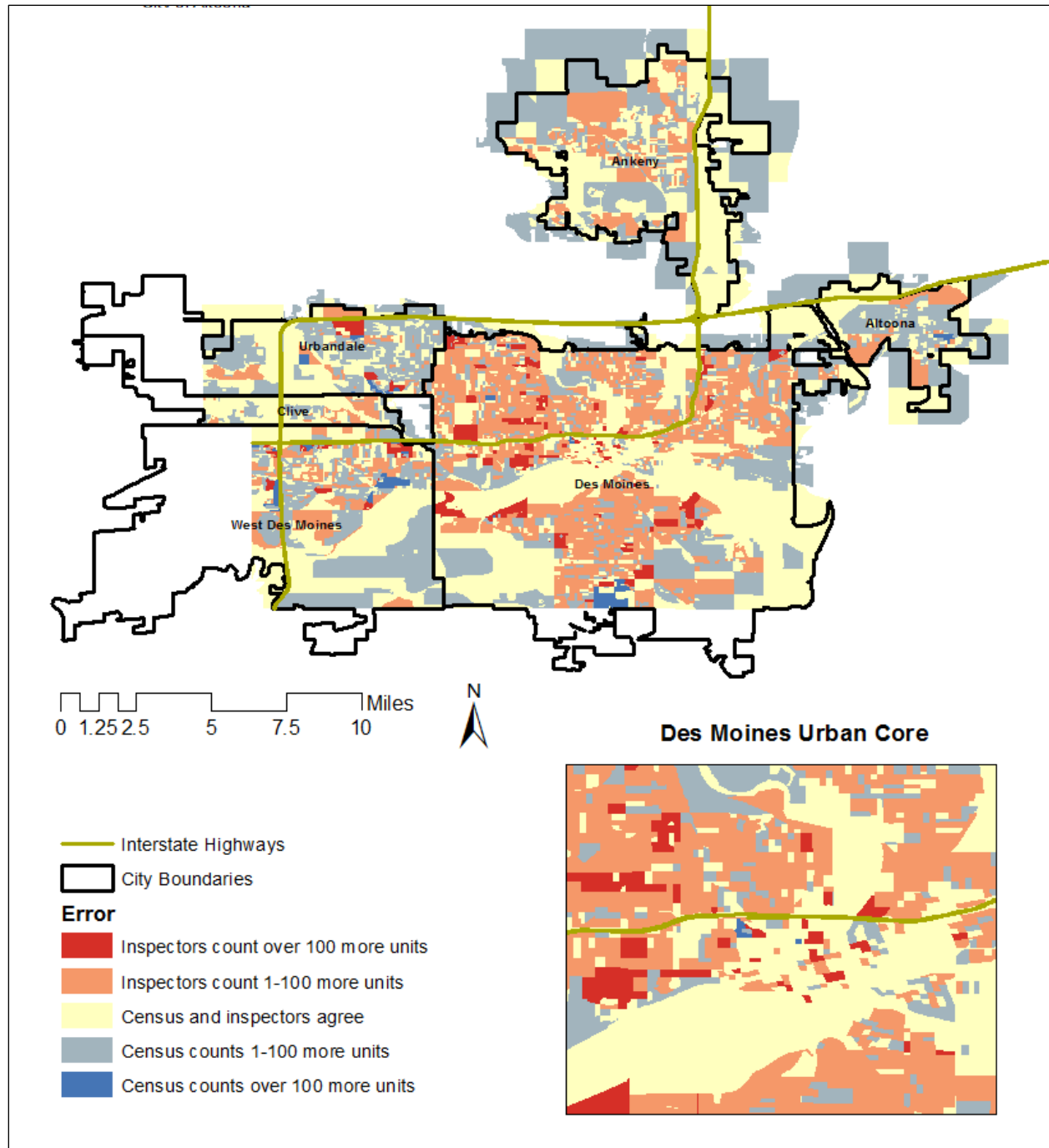**Figure 2: Difference between census and rental inspection records in count of rental units**

Source: City of Altoona, City of Ankeny, City of Clive, City of Des Moines, City of Urbandale, City of
West Des Moines, Polk County GIS, US Census Bureau (2010)

Des Moines is the only community for which the count difference cannot be reasonably explained by several years of growth or transition. This could indicate that the city has made errors in recordkeeping that have influenced our results. It could also indicate that the census forms failed to reach thousands of households in the city (or were filled out incorrectly), but this is unlikely. While the American Community Survey estimates use only a survey of 1 in 6 Americans, the census is designed to reach all households in the country and should provide a complete count of all people and units. The short form of the census includes a question about housing tenure such that all households must report if they are currently renting, which leaves little possibility of such a large error.

Anecdotal information suggests that even Des Moines' higher estimate may be missing units. For example, residents of Des Moines' Waveland Park neighborhood have created a list of over 100 rental units in their area that they believe are not formally registered with the city. We suspect that the recent economic downturn could be contributing to this phenomenon, as homeowners unable to sell their homes may resort to renting their homes for the short term to make ends meet. These "accidental landlords" may not realize that they need to register their homes and have them inspected. Those that do register their homes could have also contributed somewhat to a rise in the number of rental units since 2010, although it likely cannot fully explain the addition of over 35,000 units.

It is difficult to ascertain the significance of these findings. While this seems to indicate that we have successfully found concentrations of rental units that other studies may not have found, the extraordinarily high number of rental units in Des Moines does raise questions about the accuracy of this dataset. We had hoped to create a more accurate count by comparing the MidAmerican Energy list of account holders and addresses with the County Assessor's homeowner information for a given address and then identifying addresses where the contact name differed between the two lists. We would then assume that a different name meant the property was a rental property. Unfortunately, MidAmerican Energy was unable to provide us with their records. We may be able to pursue data from other utilities to fill this gap in our data. In the meantime, we will continue to use census and inspection data.

It is also important to note that while this data does provide information about the distribution of rentals throughout much of the Des Moines metropolitan area, it does not provide information about unit size, rent, or other physical characteristics of the property. We will continue to search for other sources of parcel-level data that can be used as a basis for comparison.

Estimating Affordability

Given the inconsistencies we identified with parcel-level data, we chose to use census tract-level data to estimate affordability across the county. Conventional practice has been to define rent affordability as a household spending no more than 30 percent of their gross annual income on rent. Households are considered rent burdened if they are paying more than 30% of their income toward rent and extremely rent burdened if they are paying more than 50% of their income toward rent. There is considerable debate about the validity of this method, but it is still the primary metric used by HUD and most housing needs assessments. As such, it provides a baseline measure that can be compared to other methods and other places.

We first estimated rent burden as the ratio of the total annual rent and median household income in each of the 98 census tracts in Polk County. Figure 1 shows the average percentage of income that renters in a given census tract spend on rent. Our preliminary analysis shows that for the majority of the census tracts in Polk County, households pay less than 30% of their income on rent, which means that households are not rent burdened. These are the green and blue census tracts. Yellow, orange, and red census tracts are experiencing rent burden which means that 28 census tracts show rent burden with seven falling near or beyond the severely rent burdened threshold. Households in the northern half of Des Moines are more likely to be rent burdened than those in the south and the most rent burdened household are located in the northeastern corner of the city

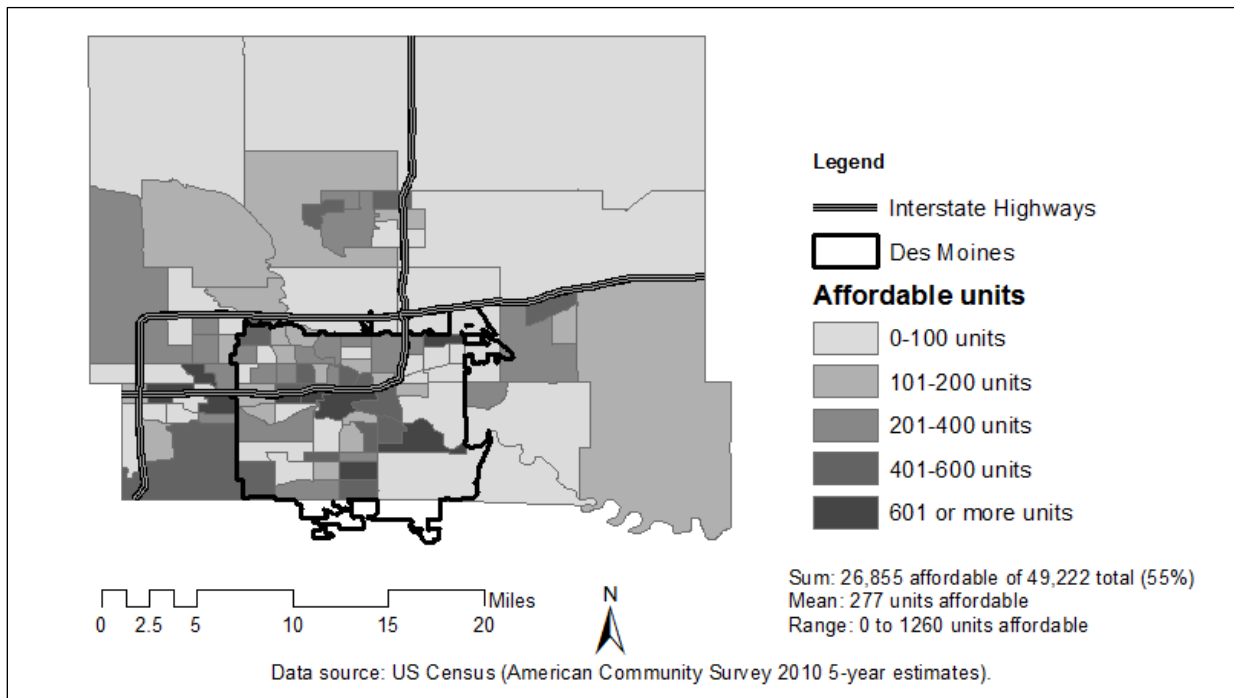**Figure 3: Percentage of income spent on rent by census tract (Polk County)**
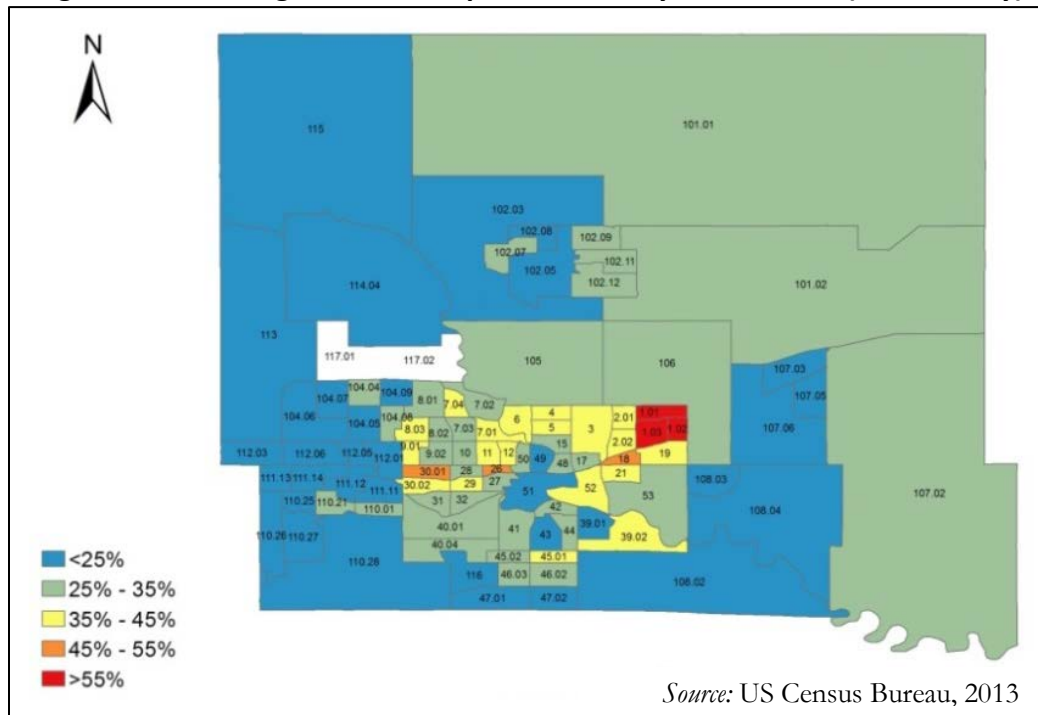
Source: US Census Bureau, 2013

There is a large variation in terms of the number of units available for rent and number of renters in Polk County. Excluding the tracts two that have no units available or any renters, the number of units varies from a low of 66 to a high of 1825. Similarly, in terms of the number of renters, the estimates vary from a low of 149 to a high of 2971. This provides a sense of the spatial heterogeneity of rental housing in Polk County.

Next we examined the distribution of the supply of rental units by census tract. Figures 4 and 5 summarize the result of our analysis. For Figure 4, we began by identifying the number of rental units in each tract that would be affordable to a rental household making $30,864 annually, which is the median income of a rental household in Polk County. This household could afford to spend $771 each month on rent according to the 30% rule. Census rent data uses increments of $50, so all units charging less than $750 were included as affordable in this analysis. According to census data, 26,855 units are affordable to the median renter household, or roughly 55% of units in the county. While on the surface, this appears to indicate at adequate supply of affordable housing in Polk County, it does not take other factors such as unit size, accessibility, or location into account. A family of six making the area median income may not be able to afford a unit large enough for their needs, whereas a household of one single adult or a couple may be able to find a rental fairly easily.

Figure 4: Number of rental units affordable to households making median county income (by tract), Polk County, Iowa

Figure 5 uses the same measure of affordability, but uses a different scale to calculate the median income. Instead of identifying the number of units affordable to the county's median rental household, this map identifies the number of units in each tract that would be affordable to the tract's median rental household. This approach recognizes that renters may wish to stay in their current area for any number of reasons, including proximity to family and friends or proximity to work. Using this measurement, 22,809 units, or 46% of the county's rental units, are affordable to households within the unit's census tract. Using this appraoch, the tracts that show a higher number of affordable units are the tracts with the highest incomes, as these more affluent renters can largely afford the relatively expensive units in their area. As a result, West Des Moines appears to have more affordable units than most parts of Des Moines.

Figure 5: Number of rental units affordable to households making median tract income (by tract), Polk County, Iowa
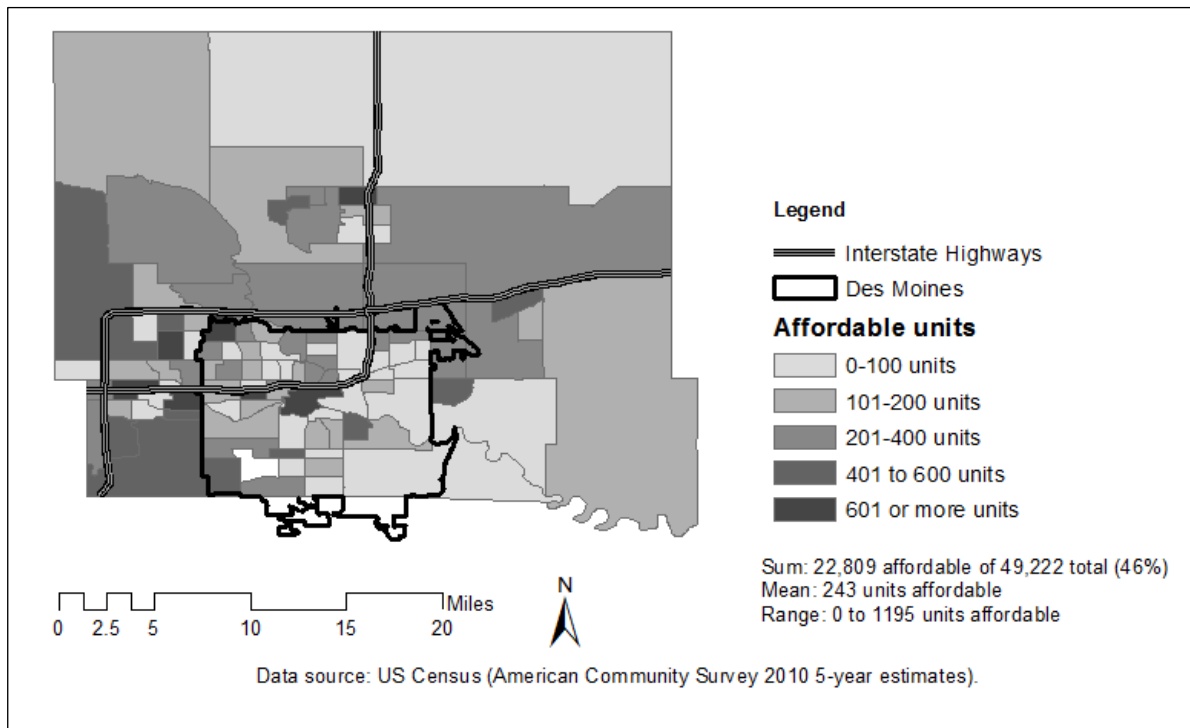
A drawback with this approach is that it treats all units as if they are equal in all ways except price. It assumes that any unit can serve the needs of any household that can afford to rent it, disregarding important factors such as unit size and bedroom count as well as access to amenities such as transit, parks, jobs, and schools, which may significantly impact the quality of life in these affordable areas. The other methods we use attempt to account for these factors and assess the affordability of rental units in the county on a more holistic level.

Alternate Measures of Affordability

A potential drawback of the traditional measures of affordability is that this measure fails to take other household expenses into account. Some households may not be able to afford to spend 30% of their income on rent due to high costs in childcare, food, or medical expenses. Some may choose to live further from work to find cheaper housing only to spend more on transportation. To address these expenses, we used the "residual income" approach to calculate another estimate of affordability across the county, as proposed by Stone (2006) at the University of Massachusetts, Boston. This approach posits that a home is only affordable if a household can afford to pay rent after paying for their other necessary living and sustaining expenses.

To calculate cost of living for this measurement, we used MIT's online Living Wage Calculator. This calculator aggregates information from national agencies and sources like the Consumer Expenditure Survey, the National Association of Child Care Resources and Referral Agencies, the U.S. Department of Agriculture, and the Medical Expenditure Panel Survey. It provides estimates for monthly household expenses including: the cost of food, childcare, medical expenses, transportation, annual taxes, and "other expenses." These estimates are provided in Table 3.

Table 3: Typical monthly expenses, Polk County, Iowa

Monthly Expenses	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Food	$242	$357	$536	$749	$444	$553	$713	$904
Child Care	$0	$521	$967	$1,412	$0	$0	$0	$0
Medical	$119	$408	$434	$416	$272	$399	$376	$386
Housing	$506	$737	$737	$944	$604	$737	$737	$944
Transport-ation	$306	$595	$686	$736	$595	$686	$736	$748
Other	$65	$163	$220	$293	$119	$155	$176	$202
Monthly income after taxes	$1,238	$2,781	$3,580	$4,550	$2,034	$2,530	$2,738	$3,184
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Annual taxes	$3,252	$7,293	$9,402	$11,941	$5,344	$6,654	$7,187	$8,351
Annual income pre-taxes	**$18,108**	**$40,665**	**$52,362**	**$66,541**	**$29,752**	**$37,014**	**$40,043**	**$46,559**

Source: MIT Living Wage Calculator. http://livingwage.mit.edu/counties/19153.

Last accessed July 11, 2013

Table 4 provides the living wage calculations for Polk County based on these assumptions. As the table shows, working adults in Polk County must earn more than minimum wage to have a wage that adequately addresses the cost of living in the region. Households with a single adult working full time at minimum wage and raising two children or households with one adult working full time at minimum wage and one adult providing fulltime care to a child are living below the poverty level.

Table 4: Living wage calculation for Polk County, Iowa

Hourly Wages	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Living Wage	$8.71	$19.55	$25.17	$31.99	$14.30	$17.80	$19.25	$22.38
Poverty Wage	$5.21	$7.00	$8.80	$10.60	$7.00	$8.80	$10.60	$12.40
Minimum Wage	$7.25	$7.25	$7.25	$7.25	$7.25	$7.25	$7.25	$7.25

Source: MIT Living Wage Calculator. http://livingwage.mit.edu/counties/19153.
Last accessed July 11, 2013

Using the available data we collected, it was not possible to separate households in terms of the number of dependent children. Instead, we assigned each person 28% of the estimated cost of childcare for one child and multiplied cost per person by the average household size of renter households in each tract. (We chose 28% because 28% of renter households in Polk County have children, so averaging the cost of childcare for all households would yield roughly this amount.) Thus, a household of three would be assigned roughly the cost of childcare for one child (84%), assuming the third member of the household is a child. This may not always be the case, but leaving out childcare costs would likely overestimate affordability by a wide margin, as this is one of the most significant expenses in the average family with children. This amounted to an additional $175 monthly per person, which could impact our results somewhat.

Combined, these costs were estimated at $13,911 per person annually. This number was multiplied by the mean renter household size of each tract, and subtracted from the tract's median renter household income to compute the median "residual income" for each tract. This was assumed as the amount that a household could spend on rent.

Of Polk County's 98 census tracts, 41 (almost 42%) showed a negative median residual income (see Figure 6). This indicates that median renter households in these tracts could not even afford the lean lifestyle described by the national cost of living estimates. They may forgo medical treatment, childcare, or even food to make ends meet, or they have developed informal solutions to meet these needs. These numbers also do not include assistance in the form of food stamps, section 8 vouchers, or other government aid. However, some tracts

reported residual incomes so low (11 tracts showed residual income lower than -$1,000 per month) that even these forms of assistance and the potential for overestimating childcare costs cannot explain the negative number. The least affordable tract reported a shocking median residual income of -$2,517 per month. (In this tract, 89% of households have children and the mean household size is nearly 4, raising their cost of living substantially.) Although they are only estimates, we believe that these results do suggest a significant lack of affordable housing in at least some parts of Polk County.

Figure 6: Rent affordable to households making tract median income (by tract), based on residual income method
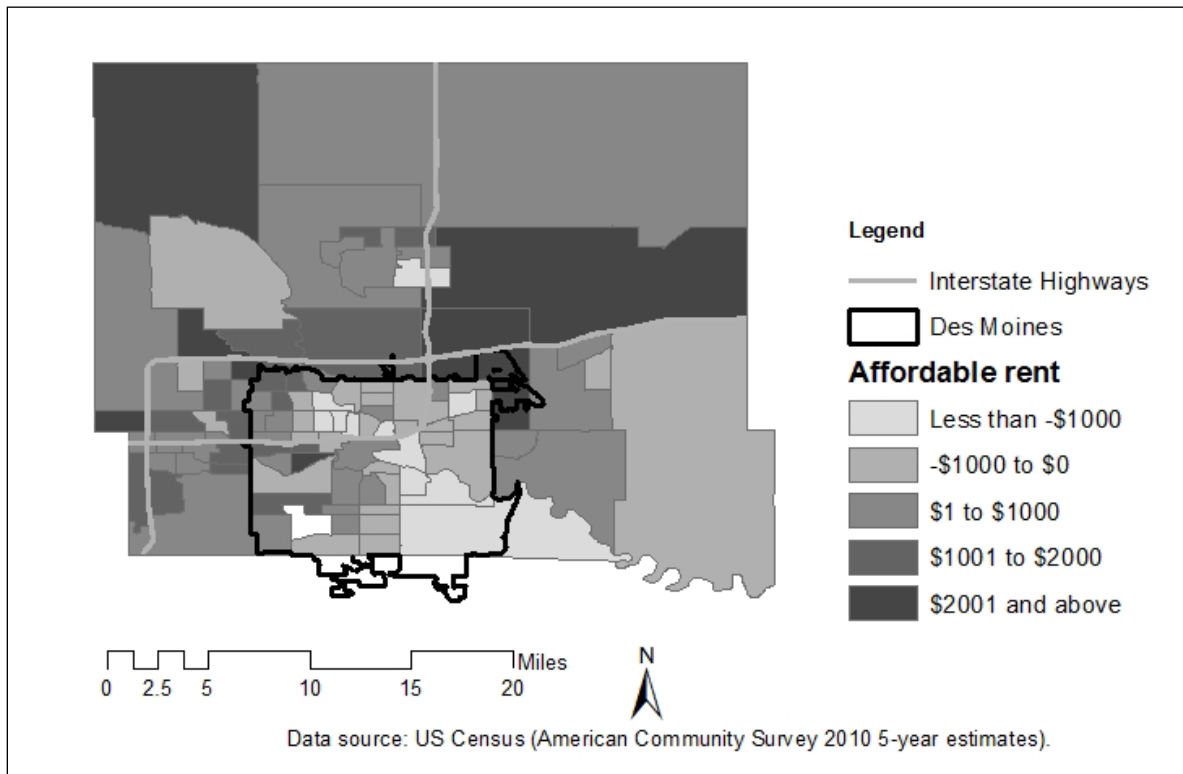
Given the questions generated by the above approach, we attempted to find other sources for cost of living information. As suggested by Kutty (2005), we used 70% of the federally defined poverty line to estimate cost of living, simulating the price of the poverty-level basket of non-housing goods. However, using this estimate (the poverty line for the mean household size of each tract) resulted in what we believe to be an overestimate of affordability. Nearly all units were affordable using this definition, and the majority of census tracts showed over $1,000 per month in residual income.

We also attempted to find more local data regarding cost of living, assuming that federal estimates may overestimate the cost of living in the relatively affordable Midwest. To this end, we recalculated residual income using estimates provided by the Iowa Policy Project (IPP) for childcare, clothing and household expenses, food, health care, and transportation to compare to the MIT estimates. However, the IPP estimates that the cost of living is $6,320 higher per person per year than even the MIT estimates we started with, suggesting that housing is even less affordable than previously expected. Both estimates, then, reveal that many household are unable to afford a basic standard of living in Polk County. These households do have homes, and are paying for them somehow, but they may have to sacrifice other basic necessities (or take on debt) to maintain them. As a result, these households are more vulnerable to losing their housing in the future.

Figure 7: Percentage of affordable units by census based on residual income method (Assuming area median income for renters, household size of 2)

Data source: US Census (American Community Survey 2010 5-year estimates).

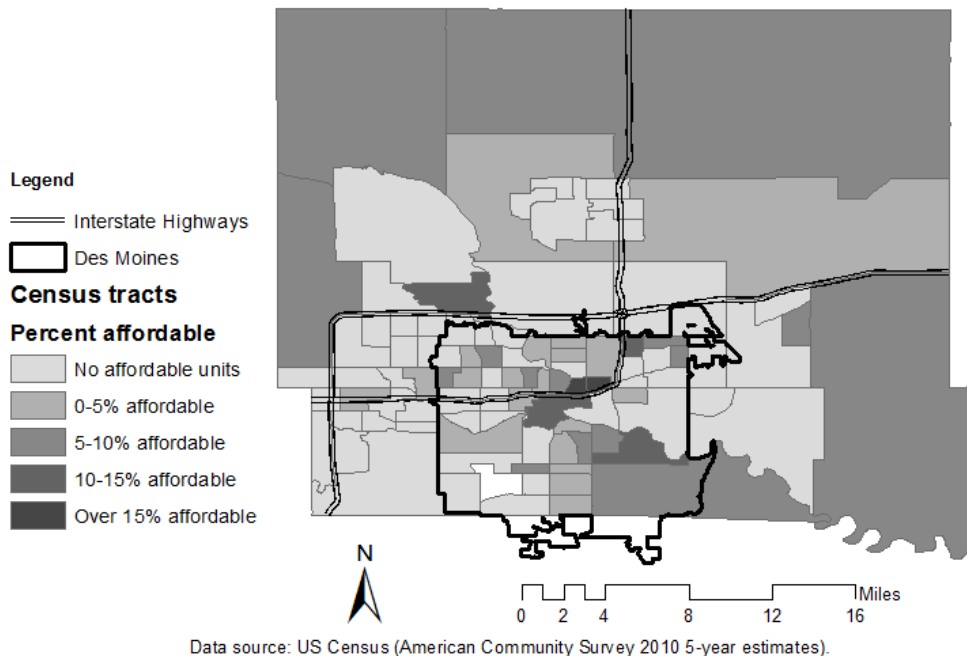Figure 7 uses the residual income method to analyze affordability. The calculations use the county's median income for renters, which is $30,864 for a household size of 2 with a residual income that allows for rents of $254 a month. Based on the median rent for each census tract, the map shows that large areas of Polk County have no affordable units and in only 5 tracts are more than 15% of the units affordable.

Estimating the Impact of Amenities

To quantify the impact that various amenities have on the cost of housing, we hope to develop a rent model for Polk County that will predict rent costs for a given location based on a number of factors. Housing cost is a result of many variables, both quantifiable and unquantifiable. While our model can never take into account variables such as perception of a neighborhood, we can use proxy variables such as mean housing cost to approximate this.

Our model will estimate rent based on access to public transit and the number of jobs and supermarkets nearby to attempt to partially quantify the local quality of life (see Table 5). Proximity to unwanted uses will be taken into account as well by including the number of contaminating Superfund sites nearby, of which Polk County has two. It will also include test scores from the local elementary school to estimate the impact of local schools on rent cost. We will also include the percentage of nonwhite residents in the neighborhood and poverty rate to assess the existing socio-economic status of the area. Median housing price will be used as a proxy for the perception of neighborhood quality and the type of housing available. Finally, the model will include the percentage of multifamily units in the neighborhood as a means of further characterizing local housing supply.

Table 5: Rent model coefficients[2]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1133.764	107.685		10.529	.000
Percentage nonwhite	-266.946	130.692	-.294	-2.043	.044
Percentage multifamily units	-137.618	82.930	-.209	-1.659	.101
Median housing value	-.593	.376	-.231	-1.578	.119
School test scores	-1.480	.667	-.314	-2.219	.029
Supermarkets within one mile	11.826	12.487	.100	.947	.346
Superfund sites within one mile	25.990	41.106	.069	.632	.529
Bus line within half mile	-26.570	32.013	-.090	-.830	.409
Total employment within one mile	.003	.002	.185	1.307	.195

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[2] Dependent Variable: Median gross rent by census tract.

We input these variables for each tract, along with median gross rent, into the statistics software SPSS to assess potential correlations. The results of the SPSS analysis are summarized in Table 5. The B column shows the coefficient, indicating the variable's correlation with rent prices, and the Sig. column shows the statistical significance of the observation. Only coefficients with significance lower than 0.05 can be assumed to be significant. This means we can assume that most of the variables identified here have little impact on rent prices at this level of analysis, with two notable exceptions: percentage non-white and school test scores.

The strongest correlation we identified is a negative correlation between percentage of nonwhite population and rent prices, indicating that higher percentages of nonwhite populations are found in tracts with lower rents. This analysis does not allow us to identify causation, but it is likely that these populations overall have lower incomes than their white counterparts, and thus live in more affordable neighborhoods out of necessity.

Figure 8: Ranking of combined reading and math proficiency by elementary school attendance area
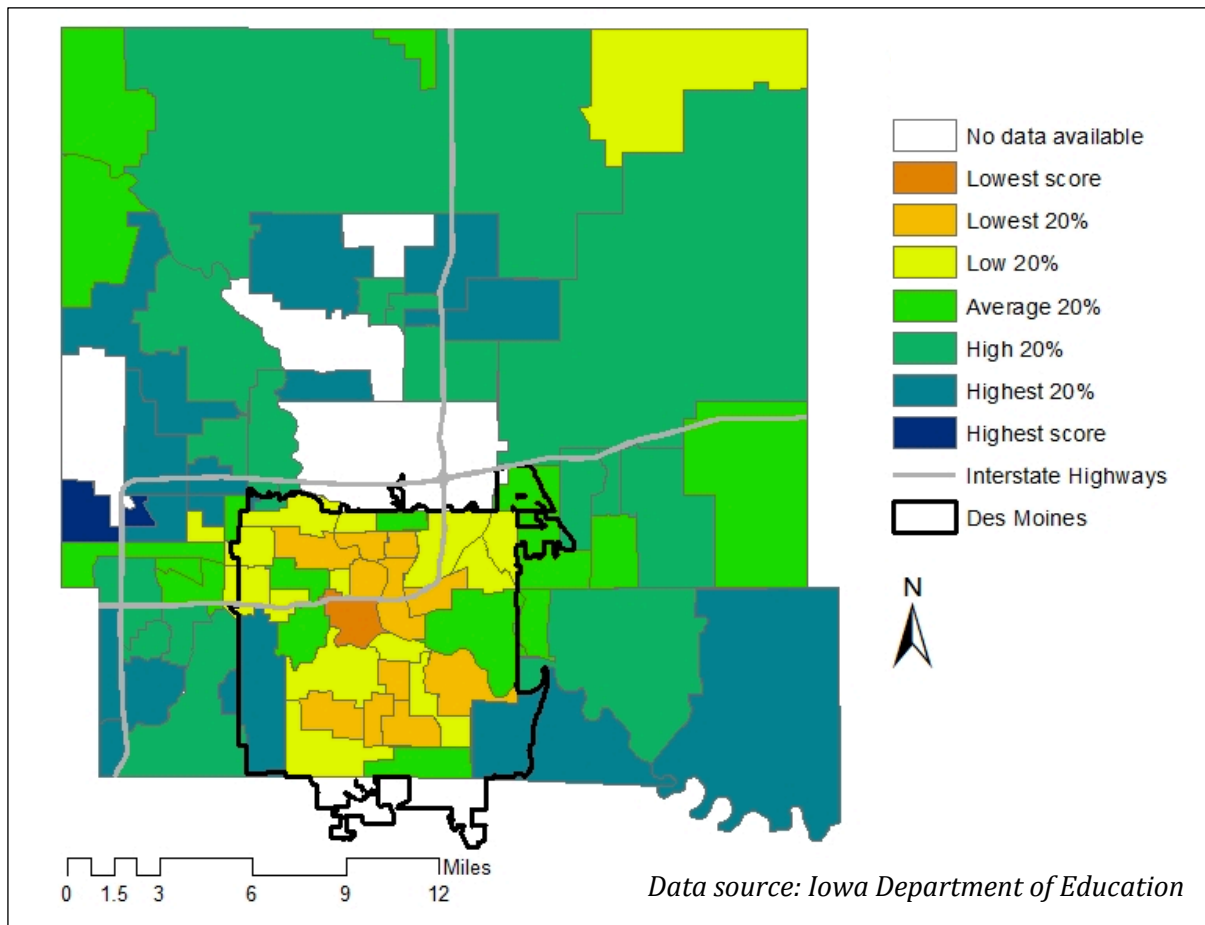
Data source: Iowa Department of Education

Our analysis also revealed that higher test scores are slightly negatively correlated with rent prices, indicating that the most affordable tracts are those with the best schools. This comes as somewhat of a surprise, but seems to indicate that rents in the Des Moines urban core are higher than rents in the suburbs where school performance is higher (see Figures 8 and 9). These results may be skewed slightly by the fact that the lowest proficiency levels in the county are found in downtown Des Moines, where rent is relatively high. The coefficient is relatively small compared to the coefficient of percent nonwhite, so test scores are unlikely to have a large impact on rent, but this connection is statistically significant.

Figure 9: Median gross rent by census tract, Des Moines, Iowa
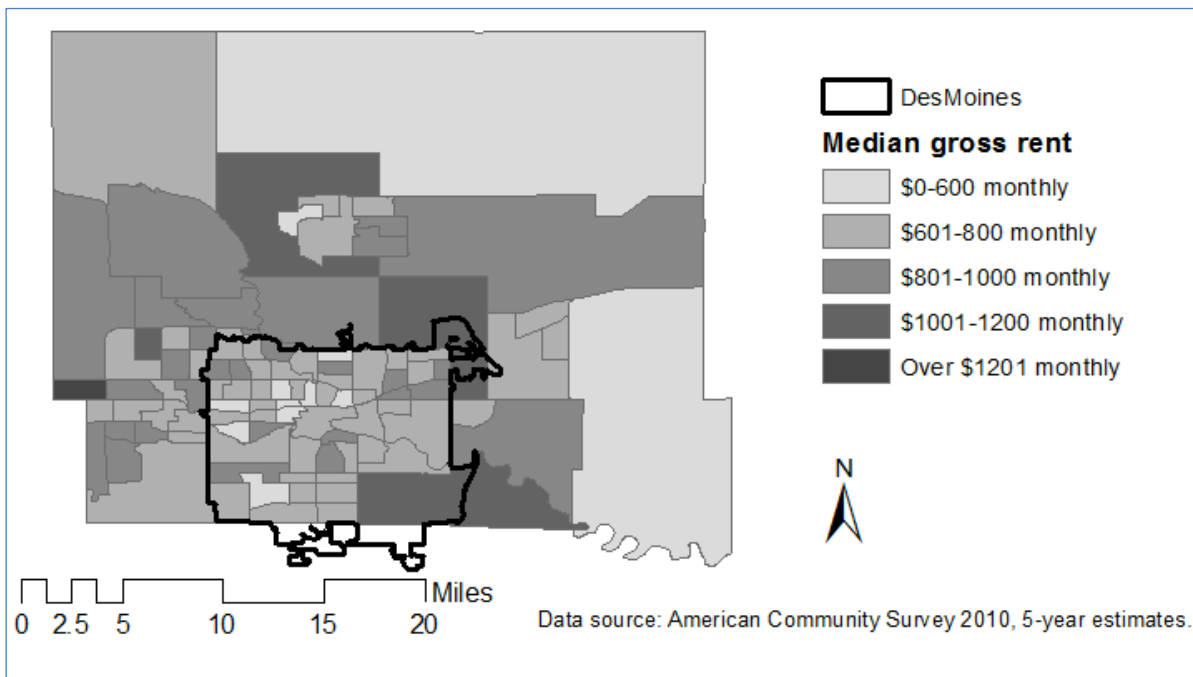
This rent model revealed that the variables we expected to impact rent are not as relevant to rent prices as we had assumed, at least not in their current form. We may be able to rework some of these variables in more sophisticated spatial analyses. For example, "total employment within one mile" is a variable defined by the number of jobs within one mile of the centroid of each census tract. We can use origin-destination tables from the MPO to get a better estimate of commute time and transportation cost to examine the connection between longer commutes and rent prices, which may be more significant. Obtaining parcel-level data rather than tract-level data would also improve the quality of the model.

PHASE II ACCOMPLISHMENTS: HOUSING BARRIERS & UNMET NEEDS

It is widely acknowledged that factors beyond supply and affordability constrain access to housing. Despite the passage of the Fair Housing Act of 1968, concentration of minorities and the poor remains a serious problem. The increasing diversity of Polk County means that these issues must be taken seriously in any consideration of housing affordability. Research has shown that neighborhoods with a high concentration of low-income households have lower local service quality, higher crime rates, and lower job access (Ellen and Turner, 2003). As in many urban areas, low-income households in Polk County are concentrated in specific neighborhoods in the urban core (Figure 10).

Figure 10: Family poverty rate in the Greater Des Moines Metro Area, 2010
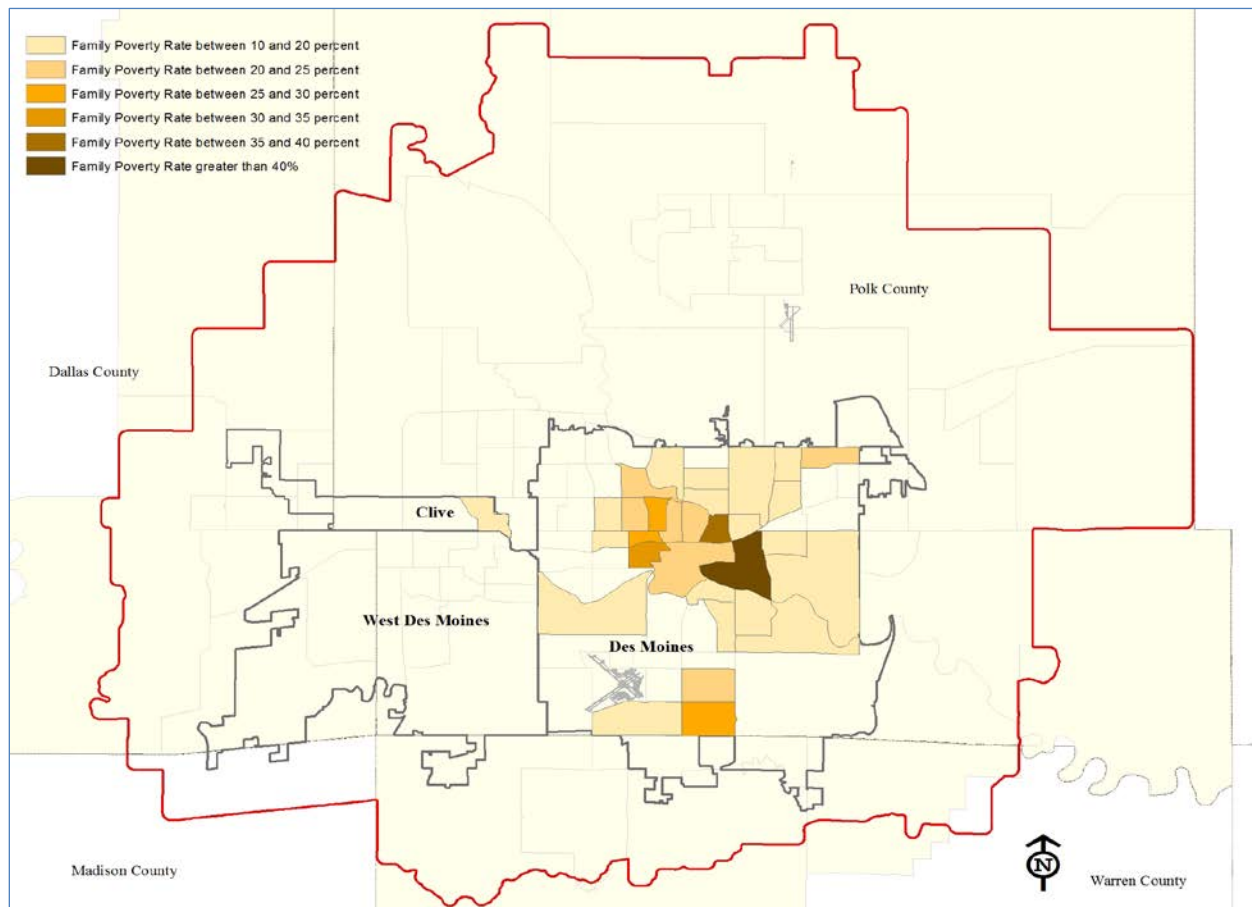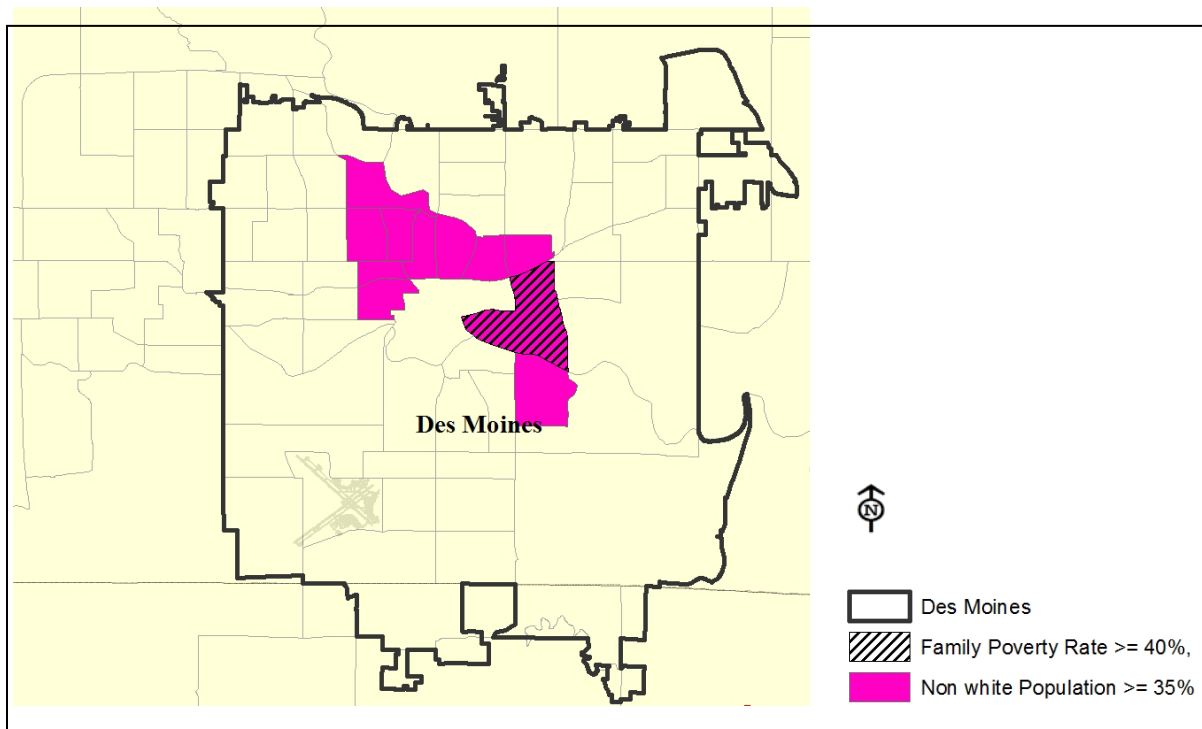

Source: The Greater Des Moines Metro Area Regional Analysis of Impediments to Fair Housing Choice Draft Report (2012)

Figure 11 shows that these high poverty neighborhoods often correspond with neighborhoods with high non-white populations. [3] These issues are well acknowledged nationwide and in Polk County, but a closer examination of the specific causes leading to this concentration of poverty and housing insecurity may provide real solutions that the metro area can implement to address these problems. As diversity increases in Polk County, so will the issues of access to affordable housing. It is important that barriers and solutions are identified early to ensure positive outcomes for the entire metro area.

Figure 11: Analysis of RCAPs/ECAPs based on local demographic patterns in the greater Des Moines metro area, 2010

Source: The Greater Des Moines Metro Area Regional Analysis
of Impediments to Fair Housing Choice Draft Report (2012)

By examining the recent history of the legal response to unfair housing practices in the area, the network of institutions which attempt to respond to housing need, and the experiences of individuals struggling with access to housing, we will paint a clear picture of both the magnitude of the need and the adequacy of the response to barriers to affordable housing access. We are fortunate in that the current levels of concentration of disadvantaged groups in Polk County do not yet match those of more segregated metropolitan areas in the region. By acknowledging trends and intervening early some of the worst problems observed

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[3] RCAP/ECAP refer to Racially/Ethnically Concentrated Areas of Poverty. HUD defines these as census tracts with a family poverty rate >= 40% and a nonwhite population >50%. To capture the situation in Des Moines, we have modified these rates as seen in Figure 10.

elsewhere may be mitigated or avoided. The primary impetus for the qualitative aspect of this study is the hypothesis that factors beyond supply affect access to affordable housing in Polk County. We must understand these factors if we intend to improve the situation

The Legal Framework

Discrimination cases and situations handled by various judicial and quasi-judicial bodies, public institutions, and non-profit entities in a jurisdiction do not make for an easy research exercise. The same legal guidelines, processes and requirements that protect a complainant's interest by keeping his/her identity confidential can bring up challenges when studying discrimination trends and patterns in an area. A similar situation was faced when investigating the housing discrimination environment in Polk County, Iowa. The agencies responsible for enforcement of the Fair Housing Act of 1968 include jurisdictional Human Rights Commissions, the State's Civil Rights Commission, HUD and local agencies like the Iowa Legal Aid that provides legal assistance to citizens. These agencies are bound by ethical and professional guidelines that prevent sharing client specific information related to discrimination cases. The information gathered from these agencies limits the finer details of geography and demographics and instead provides a broad brushstroke of the discrimination pattern in the region.

The study attempted a comprehensive overview of housing specific discrimination by identifying and exploring the possibility of accessing data shared by other sources such as the Polk County District Court, the Iowa Bar Association, City Attorney General offices within the County, the Iowa Legal Aid, HUD and some local private legal offices. The District Court does not maintain and index its case records in a manner that lends itself to search or select based on type of case. This makes it very difficult to access discrimination cases in general and housing discrimination cases in particular. The Iowa Legal Aid is potentially a great resource to identify the barriers and challenges faced by low-income and minority population when accessing housing. It is a non-profit agency that provides legal support and assistance to its predominantly low-income and minority clients. The Iowa Legal Aid is also bound organizational guidelines and attorney client privileges and could not share client specific information. Moreover, it does not maintain its case records in a searchable digital format. The non-profit's stringent budgetary guidelines limit its ability to divert resources to extract relevant information while maintaining its confidentiality requirements. The Iowa Legal Aid remains an important resource to explore for future research studies.

Agencies like the Des Moines Human Rights Commission, West Des Moines and Urbandale Human Rights Commission support Iowa Civil Rights Commission (ICRC) in its enforcement efforts. The West Des Moines and Urbandale Human Rights Commissions are non-judicial entities and work with ICRC to address complaints from respective

jurisdictions. Des Moines Human Rights Commission addresses discrimination cases within the City of Des Moines and also works with ICRC to foster and enforce Fair Housing Act.
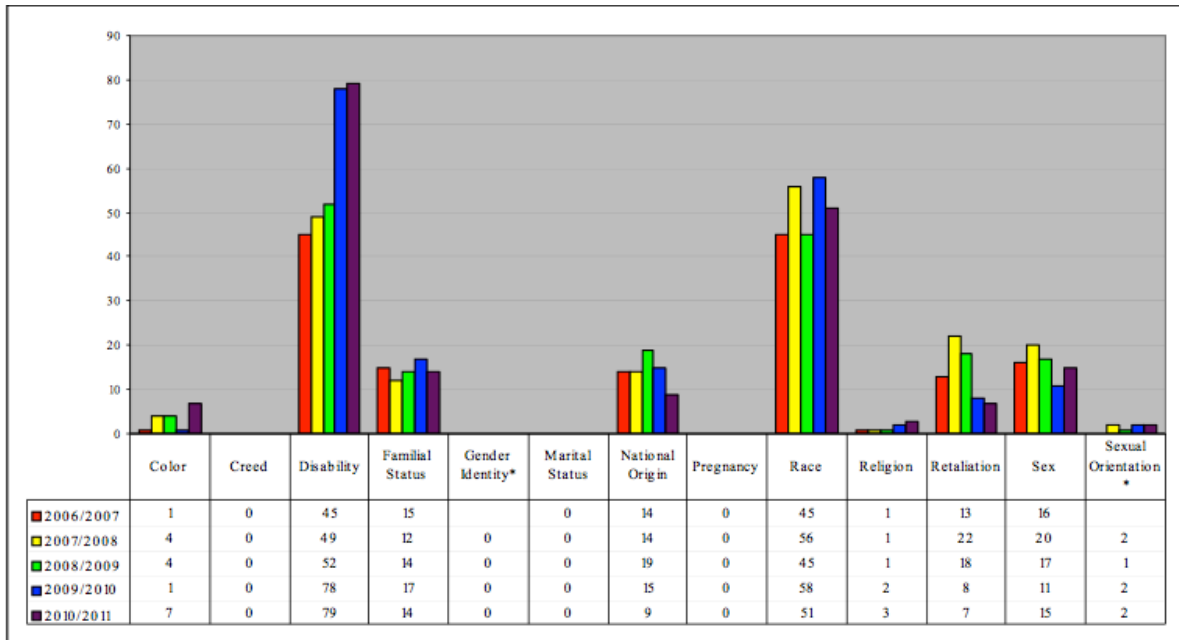
This study worked with data from Iowa Civil Rights Commission (ICRC) to understand the evolving patterns of discrimination as exhibited by cases filed with the agency. The Iowa Civil Rights Commission is one of the primary agencies charged with enforcement of the Iowa Civil Rights Act of 1965. It enforces state and federal laws that prohibit discrimination in employment, public accommodations, housing, education and credit. It provides conflict resolution services, mediation, education and training and also undertakes testing to determine the presence of discrimination across the state. The Commission is responsible for addressing fair housing queries and disputes in the Des Moines – West Des Moines metro region in conjunction with the Des Moines Human Rights Commission (from Regional AI 2012). As stated earlier, the research does not delve into client-specific information due to unavailability of client specific information form the ICRC or Legal Aid. In the absence of client specific information that can throw light on fine-grained patterns of demographics and geography, this study investigated the publicly available information shared by ICRC through its annual reports from 2001-2011. These reports provide aggregate numbers of case features including the number of mediations, settlements and court cases.

The ICRC reports show a shift in housing discrimination cases from 2001 to 2011 in the State of Iowa. The early part of the decade saw a high percentage of racial discrimination cases, followed by disability. For housing complaints in 2001, race was the most frequently cited basis of discrimination at 43% followed by disability (27%) and sex (13%). Recent Census figures show an increase in population with disability and this is posing as a barrier to accessing housing. The number of disability-based complaints has been increasing across the state, surpassing complaints based on race in 2009. At the same time the number of cases involving national origin decreased from the 2009/10 to the 2010/11 period while the number of cases that involved race or color were up slightly.

Trends in Des Moines differed slightly from those of the state. As seen in Table 7, race based complaints more than doubled in the City of Des Moines from 2008/9 to 2010/11. Complaints based on disability and religion also increased during this period of time. It will be important for policy makers to continue to follow these numbers into the 2012/13 period to see how these trends play out over time.

Table 6: Housing cases docketed by basis of claim, State of Iowa, 2006 - 2011

	Color	Creed	Disability	Familial Status	Gender Identity*	Marital Status	National Origin	Pregnancy	Race	Religion	Retaliation	Sex	Sexual Orientation*
2006/2007	1	0	45	15		0	14	0	45	1	13	16	
2007/2008	4	0	49	12	0	0	14	0	56	1	22	20	2
2008/2009	4	0	52	14	0	0	19	0	45	1	18	17	1
2009/2010	1	0	78	17	0	0	15	0	58	2	8	11	2
2010/2011	7	0	79	14	0	0	9	0	51	3	7	15	2

Source: Iowa Civil Rights Commission Annual Report, Fiscal Year 2011
*Gender identity and sexual orientation were added to the Iowa Code as protected bases on July 1, 2007

Table 7: Fair housing complaints in Des Moines, 2008 – 2011

Basis	# of complaints 2008-2009	# of complaints 2010-2011
Disability	0	4
Race	5	11
Retaliation	0	2
Religion	0	3
Race/Sex	2	0
National Origin	1	0
Sex	1	0
Unknown	1	0

Source: Des Moines Human Rights Commission, Aug. 2012

Institutional Analysis of the Affordable Housing Field

Assessing the roles, connectivity, and cooperation among the various institutions that serve those in need of affordable housing in Polk County will be important in crafting recommendations and implementing future policy decisions. Although housing needs vary greatly and span many diverse populations, the individual institutions that work in this field often have a more limited focus. Identifying these foci and assessing the network as a whole will provide a more complete analysis of the ways in which households gain access to affordable housing in the region.

To obtain this information we are interviewing key personnel in government agencies, nonprofits, and private organizations along with actors in the real estate market. This research is ongoing, but the interviews generally last between 30 minutes and one hour and cover the focus of the organization, their perceptions of the local network of organizations working in affordable housing and their formal and informal partnerships. To obtain the most candid and honest responses, the anonymity of the respondents will be strictly respected.

We are currently in the midst of our interviews and have completed 12 as of June 21, 2013. We hope to complete 10-15 additional interviews over the next few weeks. Some of the organizations that we have targeted for interviews were selected based on previous research while others have come to light during the course of our interviews.

The interviews will be transcribed and coded for themes. Because the research is ongoing, we cannot report any findings at this point, but some emergent themes have included: a lack of housing choice across the region, difficulties in dealing with recent immigrants, and a severe lack of options for the homeless and near homeless.

Although the final report will not be released until the summer of 2014, we will send a draft to all of the organizations that participated in the fall of 2013 for feedback. It is our hope that by mapping the current matrix of organizations working in affordable housing and establishing a solid methodology which may be used to continue this research in the future, the trust fund can better evaluate the partnerships it makes and the effects its funding is having.

Individual Households

Going directly to households struggling to find affordable housing will bring a clear focus to this research. Through a countywide survey complimented by in-depth interviews we will attempt to understand the ways that residents experience the mismatch in the supply and demand of affordable housing in Polk County. Their voices will compliment the other aspects of this study to test our understanding of the accessibility of the affordable housing stock.

Our survey is made up of a randomly selected sample of 2,000 of the approximately 180,000 households located in Polk County. The recipients of the mailed survey had the option to return the completed survey by mail or to respond online. The first round of surveys was sent out in early June and a reminder post card was mailed out approximately 10 days later. Finally, a second survey was mailed out to non respondents at the end of June. As of July 5th we have received approximately 340 completed responses. We need at least 383 responses to guarantee 95% confidence in our results with a 5% margin of error, so any findings at this point must be interpreted with caution.
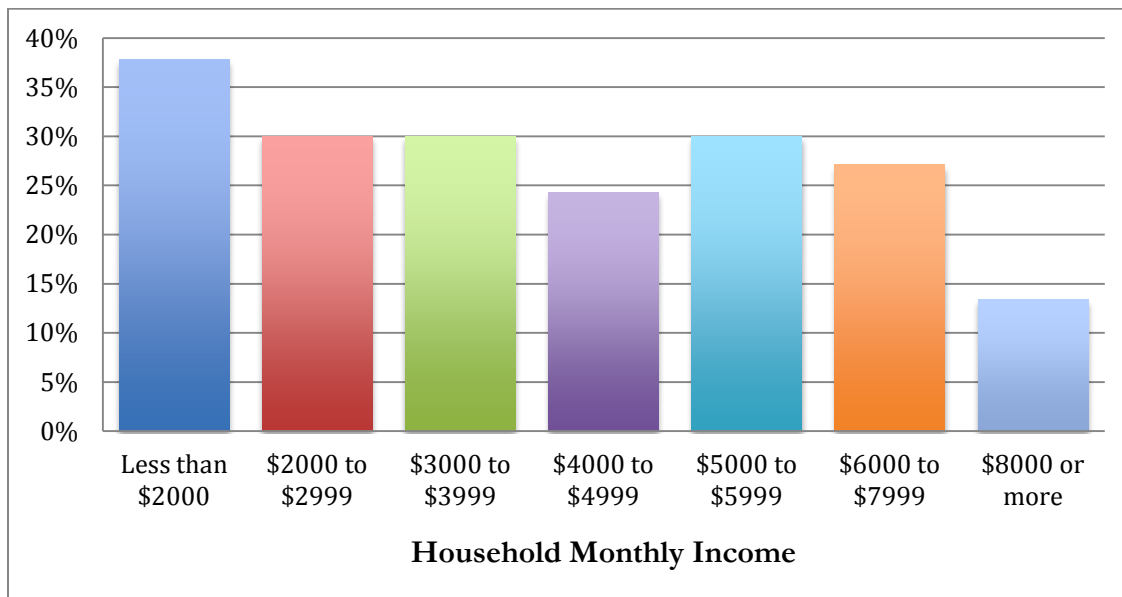
Another factor to keep in mind when interpreting the responses to this data is the inherent self-selection of a population in responding to a mailed survey. For instance older recipients of mailed surveys respond at a higher average rate. In the results we have received so far, 54.8% of our respondents have indicated their age as 55 or older. According to the 2010 Census figures only 34.8% of householders in Polk County are age 55 or older. We have also received a much lower percentage of responses from renters as opposed to homeowners. As we move forward in our analysis we may weigh responses differently to reflect this fact.

Keeping those caveats in mind, we can begin to report some of our initial findings. Some of what we are seeing so far is unsurprising, but by understanding the current situation through solid data we will best be able to track future changes and their effects. This survey is a tool that the Polk County Housing Trust Fund could use in the future to track changes in the demand for housing in Polk County.

Already our results point to some of the inherent problems in the local supply of affordable housing. For instance it is concerning that non-whites appear to be much less satisfied overall with the quality and affordability of their housing. It is also clear even in this preliminary stage that those households with lower incomes have a much higher likelihood to be cost burdened (see Figure 12). We have not yet controlled for household size, but more than 40% of households earning less than $2,000 a month (just over 30% of area median income) are paying too much for housing. Although we are not collecting exact figures for expenses or income many appear to be spending 50% or more of their income on housing. At the same time, many respondents earning less than $2,000 a month were retirees who have very low housing costs and were not considered cost burdened. In the final version of this report we will be able to separate out these different populations to best understand the needs of various groups in Polk County.

Figure 12: Respondents who feel they are paying too much for housing, by income

A total of 26% of our respondents from across the region indicated that they feel they are paying too much for their housing. While 85% of respondents indicated that their housing is adequate for their needs and the needs of their families, 15% of respondents feel that their current housing is somehow inadequate. The Figure 13 shows the most common issues that respondents indicated caused their housing to be inadequate. The sum of these percentages exceeds 15% because some respondents indicated multiple complaints. Complaints in the "other" category include housing that is too large or poorly designed.

Figure 13: Non-price related housing issues
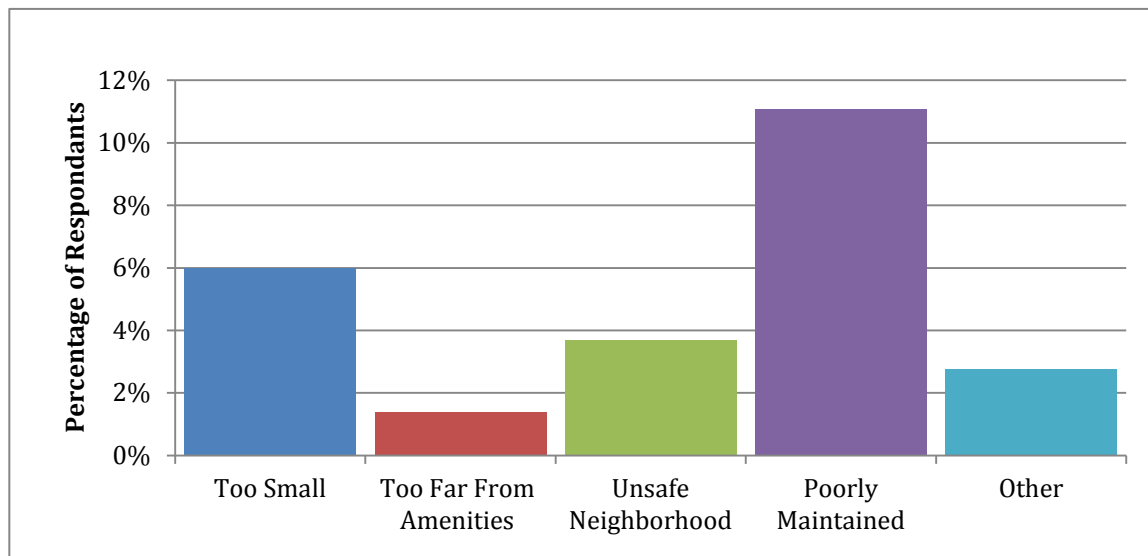
It is of course too early to draw any real conclusions from these preliminary data. Once we have obtained a statistically significant sample we will be able to move forward with the more in-depth final analysis. Our survey includes much more information than we were able to present here including geographical distribution, proximity to employment, and condition and size of the housing involved that we hope will help us bring important data to the discussion of affordable housing in Polk County.

The next stage of this component, which is set to begin in mid-July, involves in-depth interviews with selected respondents to the survey. On the survey, respondents were given the option to leave their information and be contacted for a 2-hour in-depth interview about their housing history. We will focus on those struggling to find housing with a special focus on populations that we have identified as having a particularly difficult time finding affordable housing. From the surveys already returned we have identified at least 10 good candidates for these interviews. We hope to engage these respondents on a variety of topics including: their personal histories of finding housing in Polk County, any interactions with the network of organizations that support those in need of affordable housing, and their perception of the current stock of affordable housing.

One final piece of this study will be a targeted mailing of our survey to those on the Section 8 waiting list, the Section 8 and subsidized housing waiting list is quite large in Des Moines containing over 5,000 families and individuals. These households are clearly identified as being without affordable and adequate housing and we would like to examine the characteristics of this group through our survey. Those who agree to participate in a follow-up interview will be invaluable in helping us understand the barriers to affordable housing that exist in Polk County. We are also interested in the coping strategies they use to house themselves while awaiting a Section 8 voucher.

PHASE III RESEARCH

Part 1: Model development and testing

We plan to synthesize the results of each modeling method identified in Phase II to learn new information about the geographic distribution of affordable housing. We plan to compare these results with information about the distribution of amenities like parks, schools, and employment, to more fully understand how these amenities are connected to the cost of housing. To this end, we will use statistical analyses to develop a rent model for Polk County, which will estimate rent costs given information about proximity to amenities and other intervening factors. Finally, we will offer alternate definitions of affordability and assess how much housing can be considered affordable under each definition.

Part 2: Finalize analysis of affordable housing barriers

During the first few months of Phase III, we will conduct the follow up interviews with willing individuals whose answers revealed particular challenges in finding or maintaining affordable housing. We will also continue to pursue the possibility of a survey directed at households currently on a subsidized housing waiting list. Once the surveys and interview are complete, we will finalize our analysis of the barriers to affordable housing experienced by individual households in Polk County. These findings will be included in the final report.

These qualitative pieces will help to more fully tell the story of affordable housing in Polk County. This research will pick up where the numbers leave off to help the trust fund strategically allocate its limited resources to increase the stock of affordable housing in Polk County. Once our research and analysis are complete we will report our findings to the Polk County Housing Trust Fund, and make concrete recommendations on steps that can be taken to improve access to affordable housing in Polk County. The final report will be submitted in the summer of 2014.

Part 3: Regional Planning in Des Moines

A series of plans, policies, and agencies have shaped the Des Moines metro area from the early 1960s to the present. From the mid 1960s to the early 1980s, two comprehensive, publicly-supported regional planning agencies operated in Des Moines, the first from 1965 to 1972 and the second from 1972 to 1983. Receiving support from federal and local sources, they occupied a central place in the region, offering technical expertise to local governments, reviewing applications for federal funding, managing regional service sharing, and authoring planning studies. The agencies oversaw a regional planning process that helped give shape to the spatial distribution of the region's housing market. In 1983, however, the second regional agency collapsed, but a replacement did not emerge. The agency's various programs related to housing, transportation, water supply, labor, and aging were shifted to other organizations or shut down. While a small regional agency focused exclusively on transportation planning continued to operate (due to federal law), other regional programs, including those related to water, sewer, and solid waste service sharing, were reduced to ad hoc agreements among local governments. Housing issues were excluded from both intergovernmental sharing agreements and the regional transportation agency. From 1983 on, Des Moines has had no comprehensive regional planning agency, and little cross-jurisdictional collaboration around the issue of housing. The significance of the absence of a regional agency in terms of the distribution of affordable housing remains unknown.

Three major questions related to regional planning are important to the larger discussion of housing in Des Moines.

1) How has the issue of affordable housing been included in the regional planning conversation over the years?

2) How did regional planning activities in the 1970s intersect with programs that funded affordable housing and neighborhood development, i.e. HUD, CDBG, and UDAG?

3) How has the 30-year absence of a comprehensive regional planning agency affected the distribution and quantity of affordable housing in greater Des Moines?

Based on interviews with key planning officials and archival records related to regional planning, this study will develop a detailed history of regional planning in Des Moines that covers the period from the early 1960s to the present. The history will explain how regional planning in Des Moines influenced the local housing market, with a particular focus on the distribution and supply of affordable housing. It will contribute to a broader understanding of how coordination at the regional scale shapes housing markets over time, and what the absence of a comprehensive regional planning agency means for present efforts to improve the quantity and accessibility of affordable housing for households across the region.

Part 4: An empirical verification of factors impacting rental housing affordability

This part of the project will investigate the demand aspect of the larger research project's overarching research question: "To what extent does the existing supply of affordable housing in Polk County match with the existing need for affordable housing?" Relying on quantitative rental housing and socio-economic data at the census tract level, this study will develop a rental housing affordability model that empirically verifies the factors that impact the demand decisions of households with respect to rental living units. This study uses a logistic regression model where rent burden is used as a proxy for rental housing affordability as the response variable and household income, educational attainment, householder gender, householder ethnicity, location within county, poverty rate, family status (with or without kids, married versus not married), householder place of birth, access to public transportation etc., are control variables. The model will be helpful not only to examine the statistical validity of the predictor variables, but also to predict the probability of the region being more or less rent burdened based on the set of control variables.

The hypothesis for this study is: rent burden is more evident in tracts that have lower household income levels, higher percentage of residents under poverty, higher percentage of residents that are foreign born, lower levels of educational attainment, greater percentage of residents using public transportation, female as householder, size of family etc.

It is critical that a statistical model be developed to make inferences based on statistical significance. The study uses the data described earlier and a few other variables to develop a logistic regression model that provides estimates to determine the odds-ratio that a certain tract will be more or less rent-burdened. In other words, given the socio-economic characteristics of households in a certain tract, the model provides that probability of households to be rent burdened. In developing this model, we also examine the spatial variation in socio-economic characteristics within Polk County and how the rent-burdened tracts align with these set of control variables and have trended over time. By delving into the sub-county micro-data, we expect to highlight sub-regions within Polk County that are in most need for affordable housing.

The statistical model being currently developed will provide more definitive answers in terms of the significance of the predictor variables and the direction and magnitude of the impacts. Findings of the study are expected to provide answers to the demand aspect of rental housing and will be potentially helpful for local policy makers and developers to look into current as well as future demographic data and design more effective policies to address the issue of fair and affordable housing in Des Moines and the Polk County region.

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