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GIS AS A DECISION MAKING TOOL FOR HOUSING INVESTMENT: A CASE STUDY OF THE NEIGHBORHOOD REINVESTMENT CORPORATION

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by

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ABSTRACT

The Great Lakes District of the Neighborhood Reinvestment Corporation (encompassing Indiana, Kentucky, Michigan, Ohio, and Tennessee) has begun a Geographic Information System (GIS) initiative in order to provide GIS as a service to NeighborWorks network organizations. It is designed to help them have a greater impact in their communities and to develop a tool that Neighborhood Reinvestment can use as an organization in meeting some of the goals set forth in its Strategic Plan. GIS allows users to identify socioeconomic conditions, pinpoint development opportunities, target resources, and track neighborhood change over time. This thesis identifies necessary data sources and best strategies for the development of a district-wide GIS.

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CHAPTER 1: INTRODUCTION

The Neighborhood Reinvestment Corporation was established in 1978 under Title VI of the Housing and Community Development Amendments to continue the work of the Urban Reinvestment Task Force by establishing Neighborhood Housing Services programs throughout the United States and "identifying, monitoring, evaluating, and providing grants and technical assistance to selected neighborhood preservation projects which show promise as mechanisms for reversing neighborhood decline and improving the quality of neighborhood life (Neighborhood Reinvestment Corporation, 2002b)."

Neighborhood Reinvestment sponsors 25 chartered NeighborWorks Organizations (NWOs) throughout the Great Lakes District, which is composed of Ohio, Kentucky, Indiana, Michigan, and Tennessee. These programs aim to improve the quality of life of the residents and the quality of the neighborhoods and communities where they operate.

The NWOs have a variety of methods by which they keep track of customers, who are typically low- to moderate-income families and individuals who want to purchase their first home. One such tool is a database called NWorks, which was designed by Neighborhood Reinvestment. This database tracks information such as address, race, income, female-headed households, family size, and what type of service was provided. NWOs that do not use NWorks track their clients in other similar databases and spreadsheets. Because this information has a geographic component (address), it can be mapped, and in many cases this has not yet been done. Putting this information into a geographic information system (GIS) will enable the NeighborWorks organizations to visualize their project locations and use GIS as a decision making and analysis tool. Each

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NWO's data can be put into a GIS and this information can be overlaid on other data layers, specifically data that are indicative of neighborhood conditions, improvement, and change.

A GIS project is currently underway in the Great Lakes District. The goals of the GIS initiative are to provide GIS as a service to the NWOs that will help them to have a greater impact in the communities they work in and to develop a tool that Neighborhood Reinvestment can use to meet some of the strategic goals that have been established for 2002-2006. They are:

> "Goal 1: Neighborhood Reinvestment's products and services in core business areas are responsive, integrated and targeted toward the development of the capacity of NeighborWorks organizations to perform effectively.
>
> Goal 2: Neighborhood Reinvestment will significantly expand the impact and reach of the evolving NeighborWorks network to help under-served communities and populations meet their revitalization goals and improve the quality of housing and economic opportunities for low- and moderate-income people.
>
> Goal 3: Support existing NeighborWorks organizations to expand their productivity, programmatic scope and geographic reach.
>
> Goal 4: Increase resources that primarily support the activities of the NeighborWorks system and certain other efforts in support of the community development field.
>
> Goal 5: The NeighborWorks system is in the forefront of the community development field.
>
> Goal 6: Neighborhood Reinvestment's culture, business processes and structure are aligned to meet our customers' needs" (Neighborhood Reinvestment Corporation, 2002c).

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This project operates on two scales: local and district-wide. GIS data—including zoning, property values, land use, street centerlines, and political jurisdictions, as well as databases each NWO has collected with information on their clients, addresses of program locations (lending, rehab, new construction, homeownership training)—are being collected from the cities and counties where NeighborWorks organizations operate. This comprises the local portion of the project. This data can be overlaid on Census geography and demographics and can be used for analysis and decision-making to determine where the NWOs have been successful in improving the neighborhood, to identify potential new customers, and to plan for future target areas. On the district level, data collection can show broader trends, such as underserved areas (as defined by the Department of Housing and Urban Development), poverty, and home mortgage lending from the Home Mortgage Disclosure Act aggregate reports. This will determine where Neighborhood Reinvestment could potentially find new affiliates and expand its market.

A centralized GIS could be a useful resource in meeting these goals in the Great Lakes, as it will help both Neighborhood Reinvestment staff and NeighborWorks staff decides how to allocate their scarce resources. This project will discuss how GIS improves decision making (what GIS can do) and how decision making processes can be enhanced in Neighborhood Reinvestment's Great Lakes District and its NWOs (how and why GIS should be used). It will explore how a districtwide GIS could be established for the NWOs and what information it will need to increase the effectiveness of the NWOs. This project will discuss how this management information system (MIS) will aid in decision-making processes.

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CHAPTER 2: LITERATURE REVIEW

In recent years, Geographic Information Systems (GIS) have become popular in several fields, including community development and marketing. GIS is a strong decision-making tool because of the ability for users to visualize the community, part of the reason why it has become more widely used in marketing and community development: it is able to display demographic, social, economic, and physical patterns. One of the emerging uses of GIS in community development is the creation of neighborhood indicator systems, where a community's assets and vulnerabilities are mapped for use by community development groups to target their resources to areas of need.

NEIGHBORHOOD REVITALIZATION

The Neighborhood Reinvestment Corporation's primary objective is "to revitalize older urban neighborhoods by mobilizing public, private and community resources at the neighborhood level" (Neighborhood Reinvestment 2002a). The revitalization process is dependent on processes inside a neighborhood, but also on processes occurring outside a neighborhood. George Galster (1990) has established a framework for evaluating neighborhood change that puts neighborhood behaviors into a "broader context of a metropolitanwide system of competing neighborhoods" (2).

The elements of this framework consist of stocks, flows, and decisions. The stocks are "momentary characteristics" of a community, such as population, housing and other land uses. The flows consist of the continuous movement of resources and people inside and between communities. Flows can change the stocks of a community over time. The

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decisions are the choices made by residents, property owners, and other decision-makers. Decisions influence the flows and are influenced by the stocks and anticipated changes in the stocks. Therefore, Galster states, "the stock, flow, and decisional dimensions of a neighborhood are interconnected in causal ways that... transcend the spatial boundaries of the area" (1990 2).

Galster's framework takes into account three stocks (physical, demographic, and social-interactive characteristics); three decisions (inmigration, outmigration, and reinvestment in residential property); and two flows (households and housing resources) (1990 2). The chain of causality implicit in these factors includes not only conditions and processes occurring within the neighborhood, but also processes and conditions going on outside of the neighborhood.

This has important implications for Neighborhood Reinvestment spatially concentrated efforts can have a stronger impact on a neighborhood than dispersed efforts. Owner-occupants tend to reinvest in property more heavily than absentee owners because of the value added when property is improved Galster observees that "for absentee owners of rental dwellings, reinvestments appear to be positively correlated with current and expected rental revenues, lower prices on inputs used for reinvestment, and optimism about the future of the neighborhood." In lower-quality areas, rental property owners are more concerned with positive cash flow rather than with long-term capital gains (1990 11).

Neighborhood Reinvestment strives to increase owner-occupied housing and, as Galster stated, owner-occupants have a greater interest in maintaining their property. By

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increasing homeownership, it insures that there is a vested interest in the revitalization of the community, which will be a factor in its improvement. Concentrated efforts to revitalize a neighborhood can also affect the expectations of rental property owners, who then will be more inclined to reinvest in the property, creating a domino effect of reinvestment in both the rental and owner-occupied markets.

GIS can be used to track the stocks and flows of a community and it can be used as a tool to influence the decisions made there as well. It has the ability to pinpoint areas with certain characteristics for reinvestment strategies and can track the stocks and flows over time to show the effects of decisions made by residents and policy makers.

GIS AS A DECISION MAKING AND ANALYSIS TOOL

Maps are powerful tools because they convey geographic patterns visually, and very convincingly, to a wide variety of audiences. A GIS contains information about land development in a specialized database that can be queried and analyzed during a decision-making process. It combines databases and geography, so the information contained in the database can be displayed as a map or by various other graphic means (Ayeni 1997, 10). The strength of GIS is that these maps are interactive and data are linked from tables to the geography, meaning that the data can be called up on demand. Done correctly, maps convey information to the lay audience as well as to professionals. This is a means of democratizing information, which is important in any community development operation (PolicyLink, 2002).

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A GIS is a useful tool for collection and analysis of information over time. It can be used to track successes and outcomes and can serve as a warning device for negative community changes. Because GIS is a decision-making and analysis tool, it allows users to target their resources to an area that needs them (PolicyLink, 2002).

In addition to the ability to display information visually, GIS has the capacity to customize the display to suit a particular interest or to address a particular problem and examine that data from differing scales and levels of detail. This capacity

> can maximize our ability to visualize, experience, and ultimately solve problems that have or could have geographic or spatial features. For the most part, public sector policy makers are required to analyze problems that are presented as a narrative or as a series of numerical tables. However, research on problems solving suggests that this approach is not always the best; if the problem can be presented in visual terms, the solution may be grasped more quickly (O'Looney, 1997 13-14).

GIS technology, spatial information, and tools for managing and analyzing this information have been gaining recognition in recent years as "an integral part of the policy-making and decision-making processes which exist within government and in the private sector" (Worrall, 1991 1). GIS has many potential uses in public policy, increasing:

- Sensitivity in the monitoring of demographic, social, and economic change;
- Understanding of these changes and the interactions between the components of an urban or regional system;
- Accuracy in predicting the need for public services;
- Accuracy in identifying differences in living conditions;
- Accuracy in targeting the needs for specific resources; and

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- Accuracy in identifying markets for services and planning for delivery of services (Worrall, 1991 2-3).

While the above list of GIS's capabilities is not comprehensive or exhaustive, it shows how and why the Great Lakes District can use it to promote efficiency in management and improve the delivery of services offered by the NWOs.

NEIGHBORHOOD INDICATORS

During the first half of the 20th century, neighborhood indicators were created by the federal government to examine nationwide characteristics. However, during the 1970s, government agencies, private research companies, and academic institutions began to experiment with urban social and economic indicators. The availability of disaggregated information that allowed them to create socioeconomic profiles, needs assessments, and state-of-the-city reports for city and metropolitan areas (Sawicki and Flynn 1996 166). Into the 1980s, there was little follow-through in this field (Kingsley 1999 5). In addition, the urban indicators field was very fragmented: local policy makers were concerned with easy to understand indicators that would support a particular policy, while academics were primarily concerned with creating innovative models and theories and often would not collect data yearly in order to keep records up to date (Sawicki and Flynn 1996 166).

During the 1980s and 1990s, research in the indicators field began to shift from the urban level to the local (census tract, block group, and block) level in order to measure the quality of life in neighborhoods. These indicators examined wellbeing from many

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different angles, including economic, social, and environmental measures. The emerging indicators were of interest to business, religious, and government leaders, activists, non-profit groups, educators, and citizens that were concerned with the quality of life in their communities (Sawicki and Flynn 1996 166). The conditions for neighborhood indicator systems began to improve during the 1990s because of changing technological and governmental factors. These include increased desktop computer speed and capacity along with a reduction in price, automated address matching software and GIS (Kingsley 1999 5). GIS technology has become more accessible over the past decade as prices have decreased and powerful systems have been developed for desktop computers (Sawicki and Flynn 1996 166). In addition, neighborhood indicator research has advanced along with the automation of administrative records, the presence of local intermediaries whose primary goal is the development of neighborhood indicators (see discussion of the National Neighborhood Indicators Project in Chapter 4: Case Studies), interest in information-intensive programmatic procedures, increased involvement of local institutions in local social policy, and increased collaboration of local agencies and interest groups (Kingsley 1999 5).

The shift from urban or metropolitan indicators to neighborhood level meant the shift from an entire city or metropolitan area to sometimes an area that only constitutes a few city blocks. GIS allows users the freedom to determine what the boundaries of a neighborhood are on a case-by-case basis, "employing the neighborhood scale and layout that is most responsive to the social forces and/or proposed actions being assessed" (Sawicki and Flynn 1996 169).

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There is a distinction between institutional performance indicators and social performance indicators. Institutional indicators measure "managerial accountability to citizens," while social indicators measure public welfare. According to Sawicki and Flynn, a responsive and effective neighborhood indicator system needs to take into account who it will serve and for what purpose. Some potential purposes for neighborhood indicators include:

- "Making neighborhood concerns more visible at the national level
- Generating statistics that measure meaningful change in neighborhoods
- Building capacity to systematically collect and disseminate indicators that inform and support local initiative taking
- Developing dynamic models of neighborhood change
- Evaluating the likely impact of existing and/or proposed policies on neighborhoods and/or their residents
- Measuring inequality over space and time both within and between regions
- Setting goals for neighborhood and resident improvement
- Developing surrogate census-like measures for intercensal years
- Understanding the role that the geographic mobility of residents plays in their own welfare and the welfare of their (new and old) neighborhoods" (1996 170).

Neighborhood indicator systems aim to centralize neighborhood data to provide "readily accessible information that is easily understood by a variety of people in a government, the nonprofit sector, and community-based organizations" (Sawicki and Flynn 1996 173)

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Dealing with neighborhood indicators also means dealing with related conceptual, methodological, and operational issues. One of these issues includes the inability of the indicators to measure the effectiveness of policies on changing the lives of people in spatially delineated population aggregations over time, due to rapid in- and out-migration of people in neighborhoods. Instead, indicators instead should be measures descriptive of the geographic area. These include "measures that describe characteristics of the individual residents, measures that describe statistical aggregations of people and households located in a certain geographic area at a specific time, and data that measure certain characteristics of the area itself, without reference to its population." These measures are known respectively as microdata, aggregate data, and spatial data (Sawicki and Flynn 1996 173). In addition, it is important to recognize the validity and reliability of the measures being developed in an indicator system. Some of these issues include:

- Fractional measurement: using a single, inadequate measure to evaluate a rich concept
- Quantitative instead of qualitative measures: measuring what is easy to measure instead of what is important
- Means versus goals: measuring the inputs rather than the outcomes of a process
- Goal models versus system models: measuring goals and not broader effects, which could be dysfunctional
- Concept reduction: reducing a concept into a simplistic indicator that is easy to measure
- Indirect measurement: using secondary data that is easy to obtain but not a direct measure of the concept

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- Ritualistic scientism: using elaborate statistical processes on unreliable data
- Confusing units of analysis: trying to measure characteristics of people instead of place (Sawicki and Flynn 1996 176).

In addition, while it is relatively easy to monitor change in a neighborhood, it is more difficult to determine causality because of population mobility, the different causes of change (physical, social, economic, and individual), the fact that neighborhoods are processes of self-selection, and the difficult distinction between cause and effect (Sawicki and Flynn 1996 177-178). Moreover, neighborhood indicators need to be handled sensitively to prevent the alienation of the people that live there. According to Sawicki and Flynn, "residents can have strong feelings about indicators of deficit that appear to blame the victim and to highlight pathologies" (1996 178).

Indicators also must be "purposefully selected for tracking because they relate to important societal values and goals... and must be expressed in a consistent form that permits comparison over time, and normally between places," so "indicators are usually expressed as rates or percentages rather than absolute values" (Kingsley 1999 15).

GIS IN MARKETING

In addition to its increasing use in government and nonprofit research, GIS has been emerging recently as a strong tool in marketing research. A subspecialty of GIS known as geodemographic information systems (GDIS) has been the fastest growing GIS segment (Goss 1995, 130). The main competitors in the GDIS market offer

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> decision-support systems fully integrated with massive proprietary databases composed of both individual and aggregate information consolidated from public and private sources, including the following: government records such as property registration, vehicle and driver licensing, police crime reports, birth and death certifications, and the US Bureau of the Census; records of private institutions such as banks, insurance companies, and health services provided in compliance with legislation; marketing customer information file (MCFI) systems which compile commercial information on consumers from credit bureau reports, customer mailing lists, and consumer surveys; and consumer studies such as panel surveys, syndicated media reports, and life-style and psychographic segmentation profiles (Goss 1995, 131).

This has caught on in the corporate world largely because marketing professionals understand the capacity of a GDIS to model and track consumer behavior (Goss 1995, 131).

Integration of GIS technology and its capacity for spatial analysis bolster the power of marketing databases because GDIS allows the analysis and representation of consumers and the areas where they live, which prior to the development of desktop GIS technology was only possible on mainframe computers (Goss 1995, 137). While this applies to the behaviors of consumers of goods rather than social services, social service professionals can use similar techniques to model and track the behaviors of their clients and to target demand for their services.

SUITABILITY ANALYSIS

GIS is a useful tool for identifying land that is suitable for a certain type of land use. In South Africa, the Federal Department of Housing was confronted with a problem dealing with the siting of low-income housing developments. The Department hoped to use land use planning as a means to correct "spatial inequalities and distortions that have resulted

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from planning according to apartheid and segregation policies of the past" (Biermann, 1999 200). Thus, the department wanted to make sure that housing was developed in areas that would promote the "physical, social, economic, and institutional integration of South Africa" (Biermann, 1999 200). The first phase of developing housing in such a manner is identifying land suitable for this use.

A model was developed for the Greater Johannesburg metropolitan area that assessed the suitability of land for low income housing to identify vacant land that was suitable for this use and areas to be considered for increased density and infill development. This model was required to be a

- tool for making informed decisions;
- technical tool that would incorporate readily available data from different sources into the decision making data;
- tool to facilitate stakeholder interaction so that decisions were made incorporating stakeholder input with the technical data; and
- generic model that could be used anywhere and drawing from other existing models and techniques (Biermann, 1999 201).

This model began by determining what land was available and suitable for development as low-income housing. The availability relates to existing land uses and the absence of legal constraints to residential development, while suitability quantifies physical and/or environmental constraints to development and then prioritizes the options (Biermann, 1999 202).

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Available land was assessed for suitability using a series of criteria derived from existing data sources. This was one of the limitations of the analysis. The availability of the data, not the capacity of the model, limited the criteria included in the assessment. As part of the process of selecting criteria on which to evaluate the suitability of land, each criterion must have a value statement placed on it. The value statement could either be broad, for example, "the more accessible the land is to employment opportunities, the better," or specific, for example, "land further than 20 km from work opportunities is categorized as poorly accessible, land between 10 and 20 km from work is categorized as moderately accessible and land closer than 10 km is highly accessible land" (Biermann, 1999 205). Specific value statements result in discrete suitability classes whereas the general value statements "result in a continuum of suitabilities" (Biermann, 1999 205).

After criteria were chosen and value statements were attached, scores were attached to show how well an area met a criterion. The criteria are both qualitative and quantitative; however, the measures used to evaluate the criteria must be quantified in this step. The measures are assigned to the spatial polygons in the GIS, and every data layer will have its own measures. The raw scores will then be standardized, usually into a range between zero and one. It is important here to make sure that the scores all have a common direction, so that, for instance, the higher scores indicate one thing, such as a higher suitability. In addition to assigning measures of suitability to each criterion, the criteria must be given a weight because some are more important to the analysis than others (Biermann, 1999 205-209).

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After all values have been assigned, the criteria can be combined and the weighted scores can be added together to achieve the suitability index of each intersected polygon. Suitability classes must be established in order to display the results in the GIS. The end result will yield suitability polygons ranging from high to low based on the scores and weights assigned to each of the criteria.

In South Africa, this technique was used to evaluate the suitability of land solely for the new construction of low-income housing, but different criteria such as demographics, property values, low levels of mortgage lending, vacant property, and zoning can be used in this method to evaluate the suitability of an area for new construction, infill and rehabilitation, marketing, and other purposes in the Great Lakes District of Neighborhood Reinvestment.

PUBLIC-PRIVATE PARTNERSHIPS

In order to have a successful community-based GIS, it is necessary to form partnerships with stakeholders. Without the buy-in and support of city, local, and state agencies, many GIS projects would not have been initiated. Such is the case of Richmond Local Initiatives Support Coalition (LISC) in Richmond, Virginia. In 1998, Richmond LISC formed partnerships with other Richmond community development corporations, Virginia Commonwealth University, and the City of Richmond to examine the possibility of introducing GIS into the City's community development industry. Out of this partnership, the Richmond Neighborhood Indicators Project was formed.

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Partnerships are important to the development of community-based GIS because although community groups often have the deepest knowledge of the community, GIS projects require a lot of time and resources to be successful, which the community groups often lack. For this reason, community groups often partner with universities to gain access to GIS equipment, software, and skilled users. Additionally, the data availability is limited, and it varies in amount, quality, and format. Partnerships for data are important, since universities often own some data, and other information, such as crime and tax delinquencies, are available from local government (Blackford and Mueller 2002).

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CHAPTER 3: METHODOLOGY

This project deals with the creation of a management information system to be used for housing investment. It will discuss a GIS that is already operating in one of the NWOs: Chattanooga (TN) Neighborhood Enterprise (CNE). CNE's GIS can provide some insight into what a useful GIS for housing and community reinvestment could look like. In addition, several sites from the National Neighborhood Indicators Project will be examined in order to determine what information is available from different sources, how this information can be used and presented, and what specific information will be useful and appropriate for this particular geographic information system. The steps taken in this project are as follows:

- Give a brief history of CNE and NNIP sites and the establishment of their GIS
- Determine what data is used by CNE and NNIP sites and included in their GIS
- Identify key decisions, data, and variables (information necessary for managers) to establish a baseline model GIS
- Use CNE model to help determine what information is appropriate or necessary for the other NWOs and supplement with information used in NNIP sites
- Make sure that the GIS will not cloud decision making processes with too much or confusing information.
- Examine other NWOs
    - Make certain that the established model is appropriate for other organizations
    - Look at Mission Statements

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After the model has been established, it should determine what managers need to know in order to use GIS to make decisions about where there are potential new service areas and be an effective tool in bolstering the efficiency of the organizations.

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CHAPTER 4: CASE STUDIES

CHATTANOOGA NEIGHBORHOOD ENTERPRISE

Chattanooga Neighborhood Enterprise (CNE) was founded in 1986 after a citywide visioning process and study conducted by The Enterprise Foundation to examine the state of housing in Chattanooga. In 1992, CNE merged with Chattanooga Community Neighborhood Housing Services, Inc. and became the local chartered NeighborWorks Organization. In addition, CNE is affiliated with the Enterprise Foundation. CNE receives funding from a variety of sources, including Neighborhood Reinvestment, Chattanooga City General Funds, Community Development Block Grants, the HOME Investment Partnership Program and other U.S. Department of Housing and Urban Development (HUD) funds, the Tennessee Housing Development Agency (THDA), and the Lyndhurst Foundation, a charitable foundation in Chattanooga (Chattanooga Neighborhood Enterprise 2002).

CNE has a GIS database to track information about the City of Chattanooga and Hamilton County and specific information on its target neighborhoods. The City and County layers include basic base layers, including streets, city and county boundaries, rivers and waterbodies, airports and other landmarks, and Census geography. Additionally, the database contains the County's tax parcel and building layers along with Chattanooga's city council districts.

The data specific to the target neighborhoods includes CNE-owned properties (including those held for sale, foreclosed, held for development, or rentals), zoning, troubled

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properties (i.e. back tax sale, section 8, condemned), median income and the rates of rental and owner-occupancy in those neighborhoods, major stakeholders in the neighborhood, substandard property, land use and appraised values, home sales and number of days on the market. In addition, because CNE is a lender and has access to credit ratings of their customers, they have begun compiling credit scores of their loan customers, but that data has not yet been put into a GIS data format (Thompson, 2003).

NATIONAL NEIGHBORHOOD INDICATORS PROJECT

In the 1990s, the Urban Institute began the National Neighborhood Indicators Project (NNIP), an initiative to "develop measures of changing social, physical, and economic conditions of neighborhoods in cities throughout the United States" (Sawicki and Flynn 1996 165). This initiative was launched full-scale in 1996, funded by the Annie E. Casey Foundation and the Rockefeller Foundation (National Neighborhood Indicators Partnership, 2003a). The cities participating in this pilot program were Atlanta, Boston, Chicago, Cleveland, Denver, Oakland, and Providence (Sawicki and Flynn 1996 171). The NNIP has since grown to twenty members, including six of the initial seven (Atlanta, Boston, Cleveland, Denver, Oakland, and Providence), as well as Baltimore, Camden, Chattanooga, Des Moines, Indianapolis, Miami, Milwaukee, Los Angeles, Louisville, New Orleans, Philadelphia, Sacramento, Seattle and Washington, DC (NNIP 2003b). Each individual project has collected data from the decennial censuses as a base and geocoded administrative records from their individual focus areas (Sawicki and Flynn 1996 171). Because several of these indicator project sites lie within the Great Lakes District of Neighborhood Reinvestment, they will be examined to determine what data

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they use and how it could be useful for Neighborhood Reinvestment. The sites that will be examined are the Community Research Council (Chattanooga), the Center on Urban Poverty and Social Change (Cleveland), and the United Way Community Service Council/Polis Center (Indianapolis). Although Louisville has a NNIP partner site, the Community Resource Network Data Center, it is less developed than the other three and will not be examined here.

COMMUNITY RESEARCH COUNCIL, CHATTANOOGA

The Community Research Council (CRC) is committed to performing community-related research and analysis for Chattanooga and Hamilton County, Tennessee. CRC formed in the 1960s and is a member of the United Way. According the NNIP, "the mission of the CRC is to: 1) initiate and respond to community research requests; 2) analyze data and trends; and 3) recommend actions and solutions to those attempting to build a better community." CRC offers many different services including survey design, focus groups, cataloguing, and mapping (NNIP 2003c).

The Community Research Council in Chattanooga has formed a partnership with the Southeast Tennessee Information Service (SETNIS) and the University of Tennessee-Chattanooga to create a county-wide database with population, economic, property, and public safety statistics (Community Research Council 2000). The database includes family, household, and individual income, employment, and housing costs, education statistics, family, household, and population demographics, health statistics, housing units and occupancies, property values, building permits, property sales, and land use, crime and safety data. Data on arts and culture, community assets and civic involvement, and

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the environment are being prepared but not yet available (Southeast Tennessee Information Service, 2003).

CENTER ON URBAN POVERTY AND SOCIAL CHANGE, CLEVELAND

Of all the NNIP partners, the Center on Urban Poverty and Social Change (CUPSC) at Case Western Reserve University is the only one based completely in a university. It was founded in 1988 through grants from the Cleveland and Rockefeller Foundations. Shortly after its founding, CUPSC began to collect neighborhood-level data from the Census and a variety of administrative data sources and after issuing a series of reports and analyses, the Center began to receive numerous requests for information. To respond to this need, they founded the Cleveland Area Network for Data Organizing (CAN DO) (Kingsley 1999 27).

CAN DO tracks data from the Census, such as population data,[1] poverty status,[2] families,[3] households,[4] households by type,[5] and educational data.[6] Additional education information is collected from the Cleveland Municipal School District (attendance rates and number of students enrolled).

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[1] including race, ethnicity, age, gender of the population

[2] determined by income and family size, including poverty status by age, poverty status by family type, and median household income

[3] consisting of a householder and other persons living in the household who are legally related

[4] consisting of related or unrelated persons

[5] married or unmarried, male-headed or female-headed families, with or without children living in the household, and non-family households

[6] educational attainment and school enrollment

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CAN DO also contains employment data,[7] and Census Transportation Planning Package Indicators,[8] housing data from the Census,[9] and residential mobility. Mortgage and lending data is collected from the Home Mortgage Disclosure Act (HMDA) including loan types,[10] lenders, and loan purposes.[11]

In addition, CAN DO collects data from several local and state agencies. It collects Cuyahoga County Auditor information on tax parcels including tax delinquencies, vacancies, total housing units, housing values, and number of single family homes, public assistance records from the Temporary Aid for Needy Families (TANF), Food Stamps, and Medicaid programs, child maltreatment data and vital statistics,[12] and crime data from the Cleveland Police.[13]

The majority of this data comes from the Census; however, there is considerable data from City, County, and public service agencies (Center for Urban Policy and Social Change, 1999).

THE UNITED WAY SERVICE COUNCIL/POLIS CENTER, INDIANAPOLIS

The United Way Service Council of Indianapolis and the Polis Center at Indiana University Purdue University Indianapolis (IUPUI) have formed a partnership to create the Social Assets and Vulnerabilities Indicator (SAVI) (NNIP, 2003d). SAVI contains

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[7] persons over age 16 in the workforce, total unemployed, and those not in the workforce by residence of employed person
[8] total number of workers is the number of persons who work in the geographic area
[9] number of units, vacancy, tenure, units in structure, age of structure, and median gross rents
[10] Conventional, Federal Housing Administration, Veterans Administration, or Rural Housing Service/Farm Service Agency
[11] purchase, home improvement, refinance, multifamily
[12] low birth weights, teen motherhood, adequacy of pre-natal care, fertility rate, educational attainment of mothers, and infant mortality
[13] crimes reported, arrests, 911 and police service alls, homicides, and juvenile delinquency

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data for the Indianapolis Metropolitan Statistical Area that includes the nine counties of Marion, Boone, Hamilton, Madison, Hancock, Shelby, Johnson, Morgan and Hendricks in Indiana.

SAVI's database includes information on community facilities like schools, libraries, churches, hospitals, and community centers and social demographic data including Census, health, education, criminal justice, welfare, and other data that are indicative of vulnerabilities like neighborhoods with high crime rates, unemployment, and welfare recipients (SAVI, 2003).

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Table 1: Summary of NNIP and CNE Data

Data	Community Research Council, Chattanooga	Center on Urban Poverty and Social Change, Cleveland	United Way Service Council/Polis Center, Indianapolis	Chattanooga Neighborhood Enterprise
Airports & Landmarks				x
Arts & Culture	x			
Building Permits	x			
Buildings				x
Child Maltreatment		x	x	
City Council Districts			x	x
Civic Involvement	x			
Community Assets	x		x	x
Crime & Safety Data	x	x	x	
Demographics	x	x	x	
Education	x	x	x	
Employment	x	x	x	
Environment	x			
Families		x	x	
Health Statistics	x		x	
Households		x	x	
Housing Costs	x	x		
Housing Units	x	x	x	x
Income	x	x	x	x
Land Use	x			x
Mortgage and Lending		x		x
Occupancy Status	x	x	x	x
Other				CNE-owned property
Political Jurisdictions	x	x	x	x
Poverty Status		x	x	
Property Sales	x			x
Property Values	x	x		x
Public Assistance Records		x	x	
Residential Mobility		x		
Roads and Streets	x	x	x	x
School Attendance		x	x	
School Enrollment			x	
Substandard Property				x
Tax Delinquencies		x		x
Vital Statistics		x	x	
Water Features				x

The NNIP sites all rely heavily on Census data. In addition, they also have formed partnerships with local community service agencies, police departments, and welfare

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agencies and collected. CNE's data relies heavily on local data collected from local government agencies, such as the city planning department. However, it also tracks Census-type information, such as income and housing units. CNE has access to the parcel database for the county and is therefore able to get property-specific information, such as property value or vacancy, whereas the same information in the Census is aggregated by block, block group, or block.

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CHAPTER 5: FINDINGS

BENEFITS OF GEOGRAPHIC INFORMATION SYSTEMS

GIS has been shown in many applications to be useful as a decision-making and analysis tool because of its ability to display and call up data on demand. In housing investment, GIS can be a useful tool for several purposes. While GIS cannot answer every question decision makers face when making investment decisions, it can identify areas of risk and decline along with possible investment opportunities. GIS can identify existing land use, zoning, and sensitive demographic and social conditions that would be ideal communities and areas for Neighborhood Reinvestment and NeighborWorks organizations to invest in.

One purpose of GIS in housing investment is helping managers make marketing and investment decisions. Marketing is the broader issue in this case, because GIS allows the examination of large areas and allows users to pinpoint areas of need. It can help guide investment decisions by identifying areas to focus on and providing property inventories, allowing managers to decide where and what interventions would be best for the community.

GIS can also be used as a tool for managerial accountability in using resources effectively. GIS allows better understanding of communities by showing demographic, social, and geographic patterns. Increased understanding of communities will allow evaluators to determine if decisions made by organizations are good for the organization, thus holding decision makers responsible for their actions.

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A third and equally important aspect of the benefit of GIS in an organization setting is its strength in demonstrating organizational capacity. Demonstration of organization strength and effectiveness is important in acquiring grants and funding, and GIS can be used as a tool to visually show the impact an organization has on a community.

NEIGHBORWORKS ORGANIZATION CHARACTERISTICS

There are 25 affiliated NeighborWorks organizations in Neighborhood Reinvestment's Great Lakes District. Listed below in Table 2 are the Mission Statements of each of these organizations.

Table 2: Mission Statements of NeighborWorks Organizations

Organization	Mission Statement
Affordable Housing Resources, Inc. (Nashville, TN)	To create affordable housing and strong neighborhoods.
Chattanooga Neighborhood Enterprise	To build healthy, socio-economically diverse neighborhoods to provide qualified individuals with opportunities for fit and affordable housing; to provide housing and homeownership products and services that promote healthy neighborhoods; to address emerging needs for non-traditional housing; and to ensure the financial and human resources necessary to accomplish the full mission.
Columbus Housing Partnership	Developing and revitalizing our Central City and outlying/outerbelt areas by helping low to moderate-income families throughout Franklin County and the greater Columbus area achieve the American dream of owning their own home.
Columbus Neighborhood Housing Services, Inc.	To revitalize neighborhoods and enhance the quality of life through low- and moderate- income housing and economic development.
Community Ventures Corporation (Lexington, KY)	To foster neighborhood revitalization through wealth creation and asset accumulation for lower-income people.
Detriot Neighborhood Housing Services, Inc.	To revitalize declining lower income neighborhoods for the benefit of current residents and to provide quality affordable housing opportunities within these neighborhoods.
The Home Ownership Center of Greater Cincinnati, Inc.	To strengthen communities through comprehensive home-ownership strategies.
Housing Development Corporation of the Clinch Valley (Oak Ridge, TN)	To develop, or assist in the development of, affordable housing alternatives in the city of Oak Ridge and surrounding area, for the purpose of building and maintaining a healthy, diverse residential resource for our community.

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Kalamazoo Neighborhood Housing Services, Inc.	To enhance the quality of life in our neighborhoods by fostering opportunities for affordable housing and other essential neighborhood-based community development.
Knox Housing Partnership, Inc. (Knoxville, TN)	To build a stronger community by providing desirable and affordable housing opportunities to all residents of Knoxville and Knox County.
LaCasa of Goshen, Inc. (IN)	To create opportunities for economic development, personal growth, and neighborhood improvement.
Lafayette Neighborhood Housing Services, Inc.	To renew pride and confidence in neighborhoods; promote reinvestment in those neighborhoods; and provide decent, affordable housing for low- to moderate-income persons in cooperation with residents, the business community, local government, and other interested persons in order to strength neighborhoods and prevent deterioration by stabilizing and improving property values.
The Metro Housing Resource Center (Louisville, KY)	Home-ownership promotion, neighborhood revitalization, economic development, and affordable housing opportunities.
Neighborhood Conservation Services of Barberton, Inc. (OH)	To produce neighborhood revitalization by stabilizing the housing stock, increasing property values and creating neighborhoods of choice for the benefit of current and future residents.
Neighborhood Housing Partnership of Greater Springfield, Inc.	Neighborhood Housing Partnership of Greater Springfield, Inc. preserves affordable, quality housing and strong neighborhoods through partnerships of residents, business, and government.
Neighborhood Housing Services of Cleveland, Inc.	To revitalize our neighborhoods by providing programs and services that improve neighborhoods and enhances the quality of life for our residents.
Neighborhood Housing Services of Hamilton, Inc.	Neighborhood Housing Services of Hamilton Inc. is a nonprofit housing organization that serves the low- and moderate-income residents of Butler County, Ohio, by: providing affordable loans and financial resources for housing rehabilitation; building communities; supporting resident action leaders; and providing training and education.
Neighborhood Housing Services of Toledo, Inc.	To restore and revitalize the NHS neighborhoods, primarily for the benefit of current and future inhabitants, by providing services and programs which renew pride, stimulate reinvestment and restore confidence and trust.
Neighborhood Renewal Services of Saginaw, Inc.	Combating blight and providing affordable housing in the city of Saginaw.
Neighborhoods Inc. of Battle Creek	To help neighbors achieve healthy neighborhoods.
Portage Area Development Corporation (Ravenna, OH)	To revitalize neighborhoods and communities in the Portage County Area (and extended area) through affordable housing, economic development, and job creation primarily for the benefit of low- and moderate-income households.
Project Renew (Fort Wayne, IN)	To revitalize neighborhoods in the Fort Wayne area and provide opportunities for quality affordable housing and to support community and economic development opportunities in Fort Wayne and throughout the region.
South Bend Heritage Foundation	Stabilization, enhancement and empowerment of our inner city neighborhoods.
St. Mary Development Corporation	To facilitate neighborhood development throughout the Dayton region and provide the leadership, oversight, financial resource development and strategic planning for the corporation.

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United Housing, Inc. (Memphis, TN)	United Housing, Inc. provides homeownership opportunities by creating affordable housing units, providing homebuyer and financial education and offering low-interest mortgage products to low to moderate income families in Memphis and Shelby County, Tennessee.

Source: Neighborhood Reinvestment Corporation, 2002d.

A common theme amongst the mission statements is the provision of affordable homeownership opportunities for low- and moderate-income families. These organizations aim to increase homeownership among populations with generally low levels of homeownership. In addition, many of these organizations hope to stabilize neighborhoods by increasing homeownership and fostering community and economic development.

Stability was a crucial element in George Galster's (1990) framework of neighborhood change. Residential reinvestment was one of the key decisions that he highlighted, as reinvestment was a decision made by property owners if they had positive expectations for the area. With reinvestment in communities that may be blighted or experiencing negative changes, these organizations hope to change the outlooks of property owners and stimulate positive changes.

In addition, the Great Lakes District NeighborWorks organizations draw their funding from a variety of different sources, listed in Table 3 below for fiscal year 2001, along with their organizational expenses for fiscal year 2001 and full-time staff size.

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Table 3: Contributions, Expenses, and Employees of NWOs, FY2001

Organization	Banks	Corporation and Business	Government	Foundations	Insurance	Neighborhood Reinvestment	Individuals	Utility	Thrifts	All Others	Total	Total Organizational Expenses	Employees
Affordable Housing Resources, Inc. (Nashville, TN)	$52,500	$0	$2,137,770	$72,600	$0	$436,480	$8,331	$0	$0	$16,000	$2,723,681	$1,101,717	13
Chattanooga Neighborhood Enterprise	$78,500	$57,500	$6,979,000	$912,500	$0	$147,000	$46,500	$0	$0	$0	$8,221,000	$8,545,000	50
Columbus Housing Partnership	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Columbus Neighborhood Housing Services, Inc.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	$856,153	NA
Community Ventures Corporation (Lexington, KY)	$51,696	$737,403	$54,682	$12,000	$0	$317,851	$0	$0	$2,500	$0	$1,176,132	$1,732,632	19
Detriot Neighborhood Housing Services, Inc.	$154,000	$0	$74,472	$50,000	$41,000	$56,000	$5,000	$0	$54,000	$3,000	$437,472	$537,312	5

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Organization	Banks	Corporation and Business	Government	Foundations	Insurance	Neighborhood Reinvestment	Individuals	Utility	Thrifts	All Others	Total	Total Organizational Expenses	Employees
The Home Ownership Center of Greater Cincinnati, Inc.	$24,500	$37,400	$9,000	$13,200	$54,000	$25,000	$850	$0	$5,350	$0	$169,300	$946,385	12
Housing Development Corporation of the Clinch Valley (Oak Ridge, TN)	$853,200	$583,707	$0	$0	$500	$423,318	$0	$0	$700	$0	$1,861,425	$1,133,227	6
Kalamazoo Neighborhood Housing Services, Inc.	$31,650	$29,850	$430,994	$112,409	$15,000	$155,604	$1,930	$0	$0	$88,182	$865,619	$1,567,514	16
Knox Housing Partnership, Inc. (Knoxville, TN)	$21,000	$9,787	$494,727	$188,834	$5,500	$104,800	$8,125	$0	$5,000	$0	$837,773	$988,036	10
LaCasa of Goshen, Inc. (IN)	$3,750	$49,015	$464,176	$30,215	$0	$107,500	$103,814	$0	$0	$83,942	$842,412	$1,624,234	20
Lafayette Neighborhood Housing Services, Inc.	$28,000	$5,400	$17,327	$12,500	$10,000	$218,530	$0	$0	$7,500	$0	$299,257	$2,183,299	16

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Organization	Banks	Corporation and Business	Government	Foundations	Insurance	Neighborhood Reinvestment	Individuals	Utility	Thrifts	All Others	Total	Total Organizational Expenses	Employees
The Metro Housing Resource Center (Louisville, KY)	$5,000	$18	$100,000		$2,500	$5,000	$600	$0	$0	$10,750	$123,868	$375,995	4
Neighborhood Conservation Services of Barberton, Inc. (OH)	$2,000	$2,000	$245,000	$111,000	$15,000	$178,900	$500	$5,540	$1,000	$23,125	$584,065	$425,625	6
Neighborhood Housing Partnership of Greater Springfield, Inc.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Neighborhood Housing Services of Cleveland, Inc.	$7,500	$1,500	$192,921	$10,000	$45,000	$204,030	$0	$0	$6,000	$12,155	$479,106	$781,247	5
Neighborhood Housing Services of Hamilton, Inc.	$950	$2,088	$154,928	$95,050	$30,000	$262,260	$35,366	$0	$0	$0	$580,642	$881,020	10
Neighborhood Housing Services of Toledo, Inc.	$58,500	$250	$1,408,200	$0	$42,500	$351,800	$0	$947,300	$10,000	$0	$2,818,550	$2,866,202	36

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Organization	Banks	Corporation and Business	Government	Foundations	Insurance	Neighborhood Reinvestment	Individuals	Utility	Thrifts	All Others	Total	Total Organizational Expenses	Employees
Neighborhood Renewal Services of Saginaw, Inc.	$4,250	$44,500	$696,324	$74,660	$0	$68,030	$600	$0	$0	$1,250	$889,614	$1,103,689	8
Neighborhoods Inc. of Battle Creek	$25,900	$150,000	$100,000	$209,258	$25,000	$85,000	$0	$0	$0	$0	$595,158	$5,364,116	27
Portage Area Development Corporation (Ravenna, OH)	$2,500	$0	$119,472		$20,000	$96,300	$700	$0	$0	$10,800	$249,772	$1,069,158	23
Project Renew (Fort Wayne, IN)	$1,850	$0	$189,870	$251,000	$32,500	$124,510	$0	$0	$0	$8,550	$608,280	$1,029,444	6
South Bend Heritage Foundation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	$1,766,507	NA
St. Mary Development Corporation	$22,500	$37,009	$1,759,607	$643,000	$2,500	$208,000	$27,500	$0	$0	$62,727	$2,762,843	$4,904,201	66
United Housing, Inc. (Memphis, TN)	$200,000	$0	$460,754	$1,031,875	$100,000	$402,000	$0	$0	$0	$125,250	$2,319,879	$2,120,583	9

Source: Neighborhood Reinvestment Corporation, 2002d

As shown by Table 3, NeighborWorks organizations vary in size and operating budgets, but they all depend on significant funds from businesses, charitable foundations, government, and other sources. Some organizations raise nearly all of their operating budgets with these funds. These funding sources likely require the NWOs to be accountable for the money they spend, so the NWOs must present these funding sources evidence of the difference they make with the funds or risk losing them in subsequent years. GIS can be a way to demonstrate to funding organizations that NWOs are carrying out their mission statements in order to ensure that future funding is secured.

NEIGHBORHOOD CHANGE INDICATORS

One of the important criteria for a GIS that will be useful for a management information system is to collect necessary data without collecting too much, which could cloud decision making. George Galster's framework of the stocks, flows, and decisions that are important in neighborhood revitalization is a good starting point because it identifies basic elements of neighborhood change. Indicators of neighborhood change and potential GIS data sources for these indicators are listed in Table 4 below.

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Table 4: Elements of Galster's Framework and Potential Data and Sources

Framework Element	Items	Data	Data Source
Stocks	Physical	Housing Stock	Census
		Roads/Railroads	Census TIGER Files
		Geography	Census TIGER Files
	Demographic	Population Characteristics	Census
		Income	Census
		Poverty Rates	Census
		"Underserved" Areas	HUD User
	Social-Interactive	Community Facilities	Local Government
		Community Assets	Local Government
Flows	Households	Household Characteristics	Census
	Housing Resources	Housing Stock Characteristics	Census
Decisions	Inmigration & Outmigration	Population Loss or Change	Census
		Tenure	Census
	Reinvestment in Residential Property	Mortgage lending	Home Mortgage Disclosure Act (HMDA)

Following the framework established by Galster's model, there is a heavy dependence on data from the United States Census. This dependence is not unlike that of the NNIP sites; however, all of the NNIP sites studied as well as CNE collected data from other sources, and Galster's model also requires data from other sources. The Census provides easily accessible and longitudinal information about the United States and is a building block for Neighborhood Reinvestment's GIS. While the United States Census will be an important source of information for Neighborhood Reinvestment's GIS, additional data sources will have to be used in order to get a more complete picture of the district.

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In addition, in order for the indicators to be reliable and valid for the study area, it is important to consider the issues raised by Sawicki and Flynn (1996), including the fact that the information contained in the GIS measure characteristics of the place, not the people living there.

MACRO AND MICRO LEVELS OF EXAMINATION

Neighborhood Reinvestment's GIS initiative works on two scales: the macro level, which encompasses the entire district, and the micro level, encompassing each individual community where there is an affiliated organization. The different levels of examination require different, but not mutually exclusive, data. Some of the data that are important at a large scale (smaller area), for instance local governments' tax parcel layers, are meaningless on the smaller scale. There is significant correspondence between data sources by Neighborhood Reinvestment's GIS at both levels, as shown in Table 5; however, community-specific data is required only at the micro level. Again, there is a strong dependence on data from the Census. Other data sources should also be utilized, especially on the local level, in order to get a better idea of the issues faced by the communities, whether it is declining property values, high rates of abandonment, or high levels of rental-occupied property.

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Table 5: Macro and Micro Level Data Requirements

Level	Data	Reason	Source
Macro (District)	Underserved Areas	Determine new markets	HUD User
	Median Income	Determine "servable" population	Census
	Current NWO Service Areas	Determine reach of current services	NWOs
	Population	Determine where people are concentrated	Census
	Mortgage Lending	Determine where there may be a lack of lending activity	HMDA
Micro (Communities)	Property Values	Determine affordable property	Local government
	Poverty Rates	Determine areas of need	Census
	Median Income	Determine eligibility for services	Census
	Rentals or Owner Occupancy	Determine need for homeownership programs	Census
	Mortgage Lending	Determine lending and home-buying patterns	HMDA
	Housing Stock Characteristics	Examine potential for rehabilitation	Census

Generally, the larger scale (micro level) information is more detailed, while the smaller scale (macro level) information presents a more general picture. Aggregate data will suffice for the smaller scale, but more specific data will be needed on the larger scale. District level data will primarily be used for marketing decisions, while local data will be used for investment decision-making.

PRACTICAL APPLICATIONS

Since the Great Lakes District began the GIS initiative, there has been much demand by Neighborhood Reinvestment Staff as well as NWO staff for maps of the District and individual service areas for research and display purposes. The following are examples of how GIS has been used within the district.

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NEIGHBORHOOD REINVESTMENT GROWTH PLAN

In December 2002, the research office at the Neighborhood Reinvestment corporate office released figures of the underserved areas in the country by state and NWO service area. The "underserved" determination was made by HUD, and consists of census tracts in urban areas where the median household income is at or below 80 percent of the Metropolitan Statistical Area median household income or where the median household income is at or below 120 percent of the median household income or with greater than 30 percent minority population. In rural areas, underserved areas consist of counties where the median household income is at or below 95 percent of the greater of the state or national non-metropolitan median income, or counties where the median household income is at or below 120 percent of the greater of the state or national non-metropolitan median income with over 30 percent minority population. This data had a geographic component, as it was broken down by census tract. However, at the national level, no effort had been made to convert this data from the Microsoft Access database into GIS. While the raw data itself is useful, the database file cannot convey the geographic patterns like GIS can.

The Great Lakes District decided to map this data along with the NWO service areas to examine the coverage of the underserved areas. In addition, these maps were a helpful visual representation of the district and its areas of need and were used in the Great Lakes District's 2003-2006 Growth Plan to determine areas where Neighborhood Reinvestment could find new NeighborWorks affiliates. The maps were well received by Neighborhood Reinvestment staff. The Mid-Atlantic District (New Jersey, Pennsylvania,

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Delaware, Virginia, Maryland, and West Viriginia) requested a map of that District's underserved areas for its purposes.

One technical challenge was that HUD used 1990 census tract geography to determine underserved areas, using current income and population figures. The 1990 census tracts had to be converted into 2000 geography. The most convenient way to do this was so spatially join the 1990 tracts with the 2000 block groups.

Since the 2000 block groups were used, it allowed median income and population density to be calculated for smaller areas. Since the median income for each block group could be calculated in rural areas, it allowed the isolation of the underserved areas in the county, rather than just the entire county. The population density also indicates areas where there are large concentrations of underserved areas.

Figures 1 to 4 below are part of the map series created for the growth plan. The rest of the maps created for the district growth plan can be found in the Appendix. Using this information and ArcView 8.2, the number of people living in urban or rural underserved areas was determined for the region, based on Census 2000 figures, which is shown in Table 6.

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	Urban								
State	Underserved Tracts	Total Tracts	Percents of Tracts Underserved	Total Population	Underserved Population	Underserved Population Below 20% of Median Income	Underserved Population in NWO Service Area	Percent of Underserved Population in NWO Service Area	Percent of Population Underserved
Indiana	328	963	34.06%	4,194,967	1,453,549	133,613	147,934	10.18%	34.65%
Kentucky	111	458	24.24%	1,808,964	643,974	88,495	329,781	51.21%	35.60%
Michigan	556	2,021	27.51%	7,998,703	2,887,021	190,160	1,087,275	37.66%	36.09%
Ohio	776	2,364	32.83%	8,916,886	3,140,664	314,238	2,385,678	75.96%	35.22%
Tennessee	274	760	36.05%	3,632,046	1,303,896	161,396	826,332	63.37%	35.90%
Total	**2,045**	**6,566**	**31.15%**	**26,551,566**	**9,429,104**	**887,902**	**4,777,000**	**50.66%**	**35.51%**
	Rural								
State	Underserved Tracts	Total Tracts	Percents of Tracts Underserved	Total Population	Underserved Population	Underserved Population Below 20% of Median Income	Underserved Population in NWO Service Area	Percent of Underserved Population in NWO Service Area	Percent of Population Underserved
Indiana	140	418	33.49%	1,885,518	547,859	71,115	1,091	0.20%	29.06%
Kentucky	385	536	71.83%	2,232,805	1,474,383	174,427	212,705	14.43%	66.03%
Michigan	231	507	45.56%	1,939,741	752,359	84,276	0	0.00%	38.79%
Ohio	166	490	33.88%	2,436,254	806,687	117,526	1,868	0.23%	33.11%
Tennessee	275	458	60.04%	2,057,237	1,150,493	116,638	93,385	8.12%	55.92%
Total	**1,197**	**2,409**	**49.69%**	**10,551,555**	**4,731,781**	**563,982**	**309,049**	**6.53%**	**44.84%**
	Total								
State	Underserved Tracts	Total Tracts	Percent of Tracts Underserved	Underserved Population	Total Population	Underserved Population Below 20% of Median Income	Underserved Population in NWO Service Area	Percent of Underserved Population in NWO Service Area	Percent of Total Underserved
Indiana	468	1,381	33.89%	2,001,408	6,080,485	204,728	149,025	7.45%	32.92%
Kentucky	496	994	49.90%	2,118,357	4,041,769	262,922	542,486	25.61%	52.41%
Michigan	787	2,528	31.13%	3,639,380	9,938,444	274,436	1,087,275	29.88%	36.62%
Ohio	942	2,854	33.01%	3,947,351	11,353,140	431,764	2,387,546	60.48%	34.77%
Tennessee	549	1,218	45.07%	2,454,389	5,689,283	278,034	919,717	37.47%	43.14%
Total	**3242**	**8,975**	**36.12%**	**14,160,885**	**37,103,121**	**1,451,884**	**5,086,049**	**35.92%**	**38.17%**

Table 6: Underserved Population Statistics

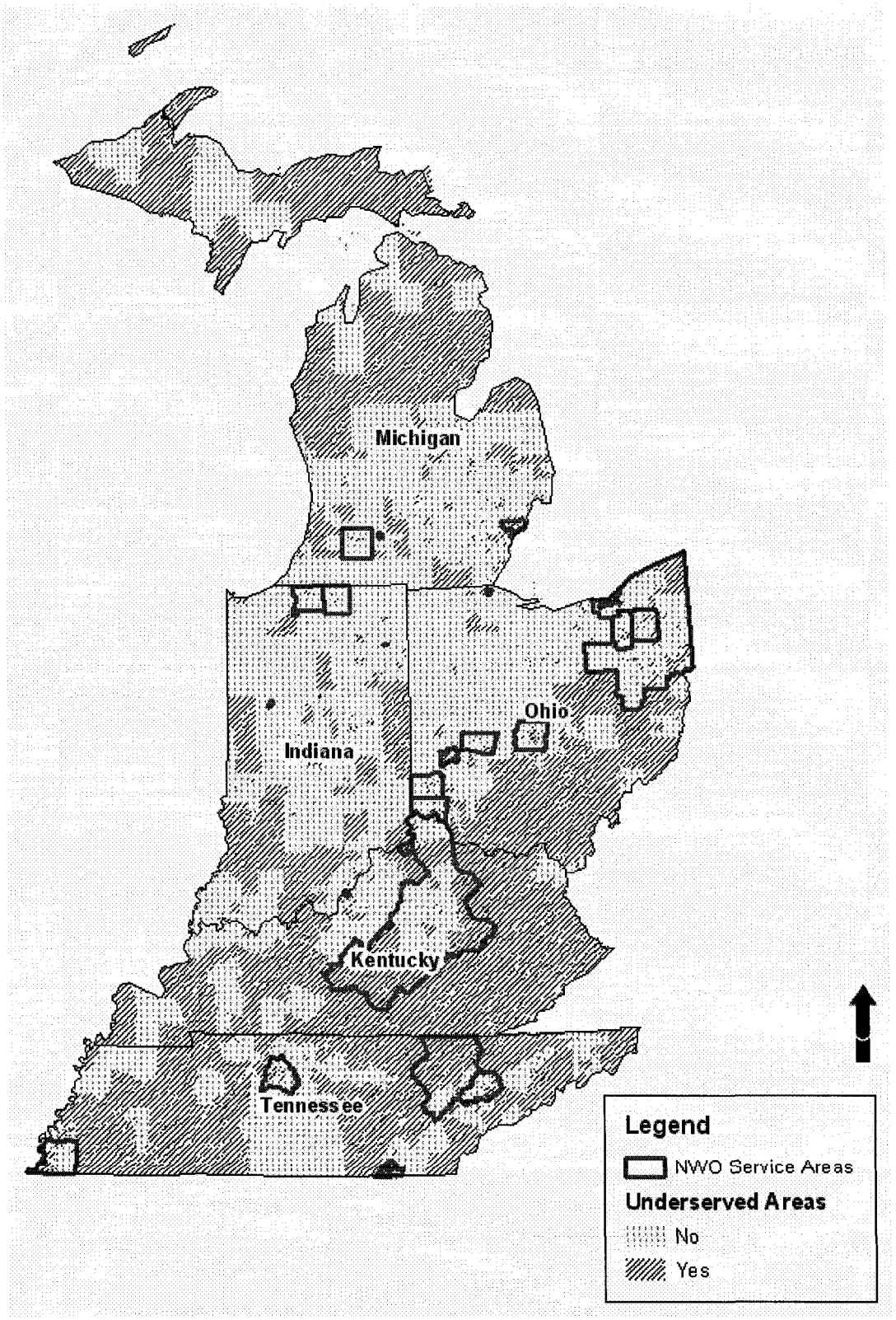

Figure 1: Underserved Areas and NeighborWorks Service Areas, Great Lakes District

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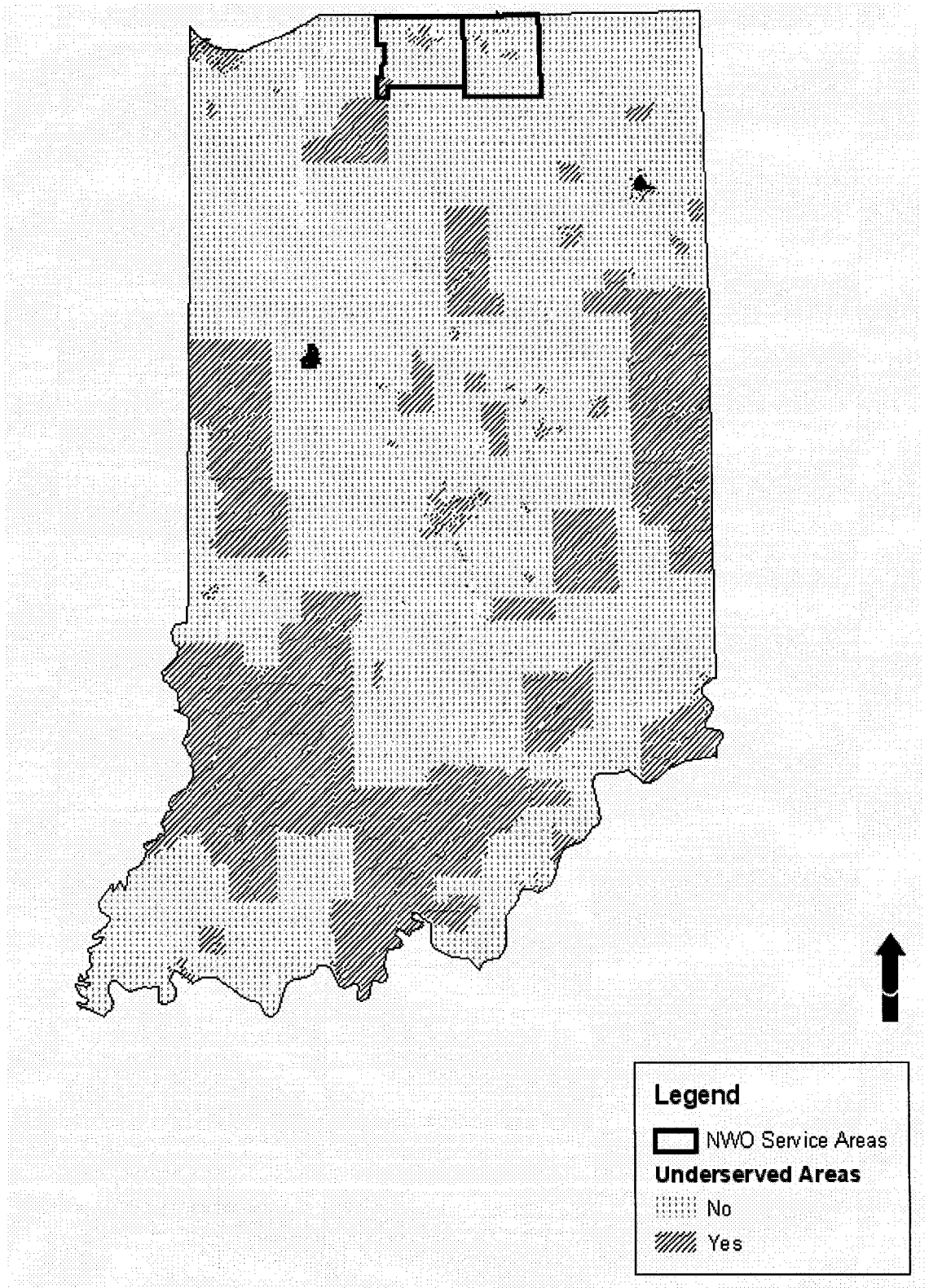

Figure 2: Underserved Areas and NeighborWorks Service Areas, Indiana

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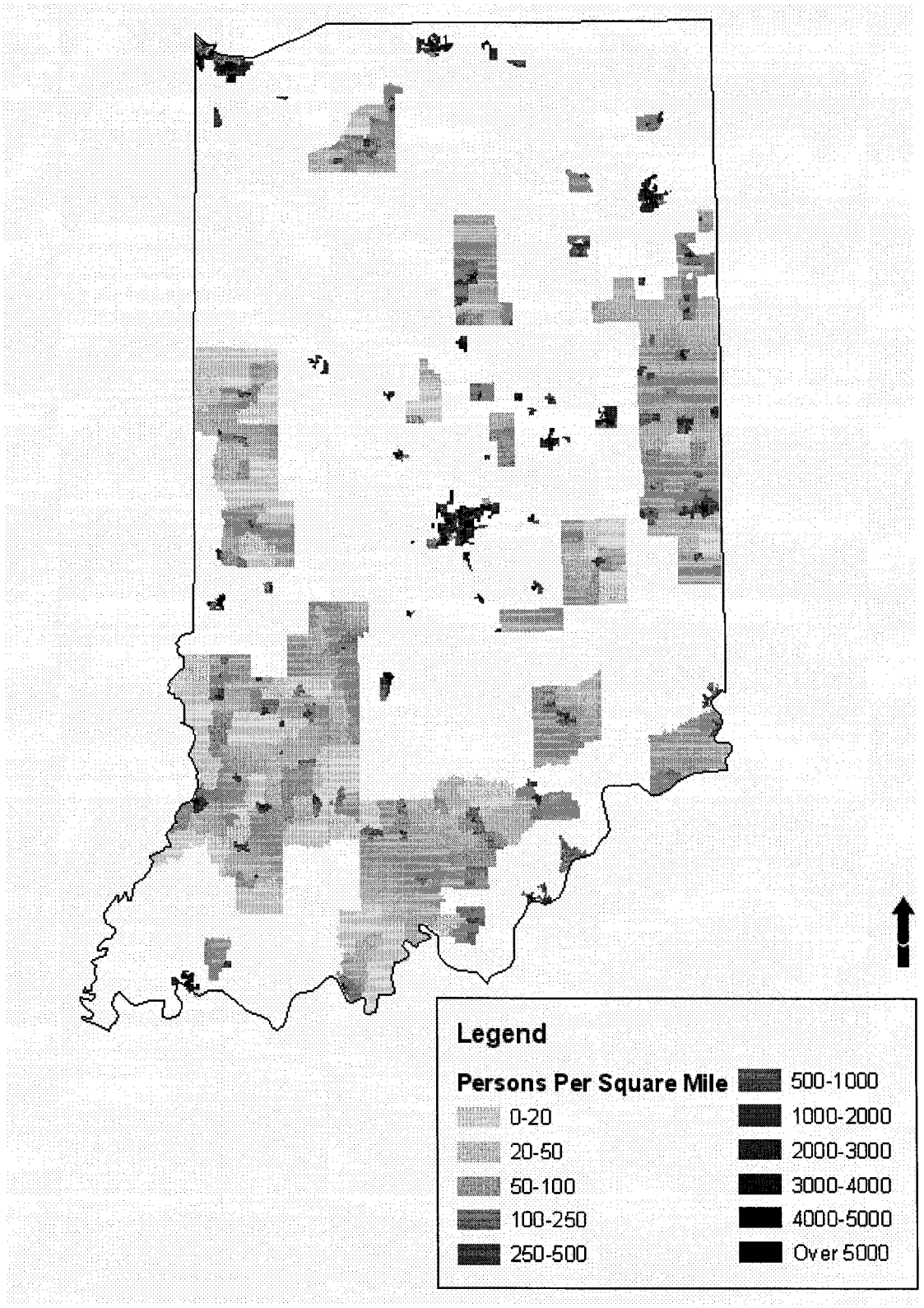

Figure 3: Underserved Areas by Population Density, Indiana

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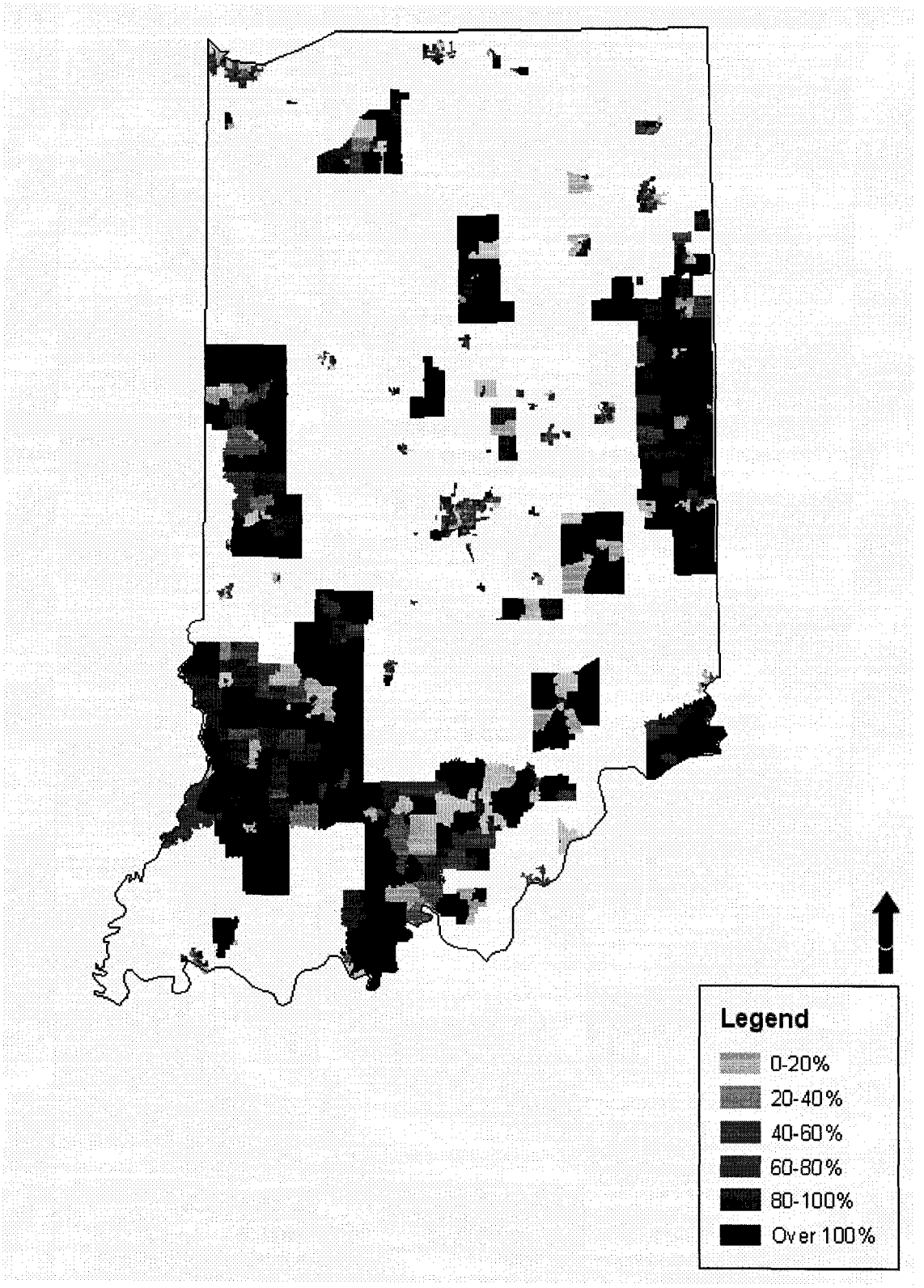

Figure 4: Underserved Areas by Percentage of Median Household Income, Indiana

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MEMPHIS: PROJECTS AND MEDIAN INCOME

United Housing, Inc. (UHI) of Memphis, Tennessee, has shown a strong interest in GIS since Neighborhood Reinvestment introduced the concept in the summer of 2002. The staff has some knowledge of GIS and has worked in the past with local government and students from the University of Memphis on mapping projects. However, because of prohibitive costs, it has not bought software or data for in-house use.

Early in spring 2003, UHI staff contacted Neighborhood Reinvestment indicating an interest in GIS and mapping services. Following this communication, Neighborhood Reinvestment received a list of UHI's project locations (loans written, rehabilitation and new construction, and property acquisitions) and addresses. The addresses were geocoded and overlaid with each census tract's percentage of Metropolitan Statistical Area (MSA) median household income. This map, seen in Figure 5 below, shows that UHI is meeting its mission statement's expectation of helping low- and moderate-income families and neighborhoods because the majority of their projects take place in census tracts with 40 to 60 percent of the MSA median income. Feedback from UHI staff indicated that this map was very helpful and very convincing and impressive to its Board of Directors, whose continued support is necessary in order to receive funding to continue carrying out their mission.

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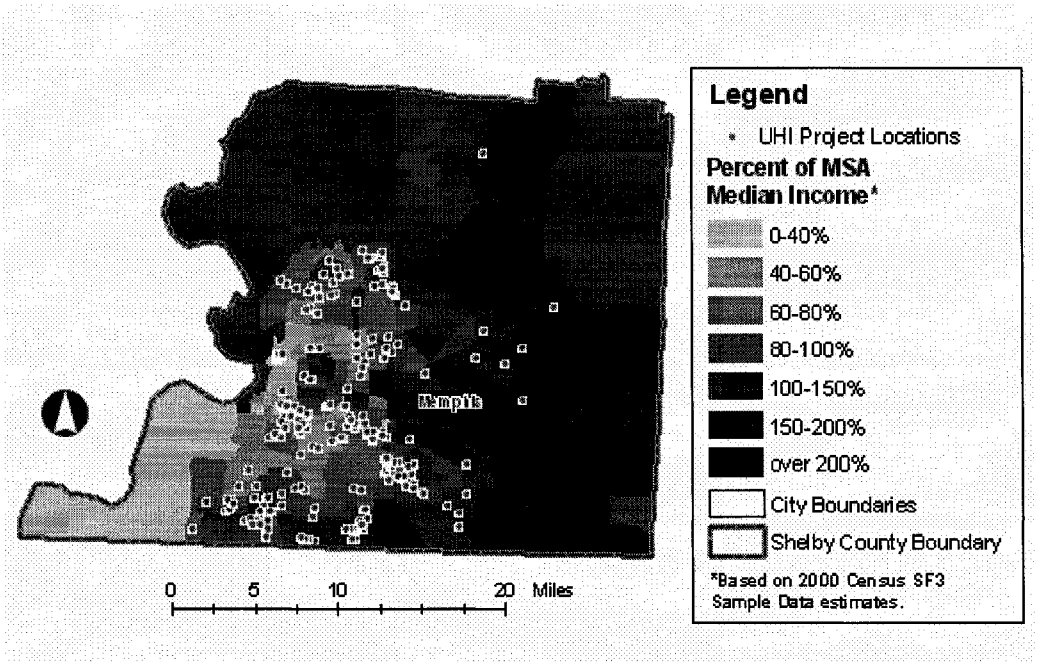

Figure 5: United Housing, Inc. Project Locations and Percentage of Median MSA Income, Shelby County, Tennessee

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CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

GIS can be used by Neighborhood Reinvestment not only as a tool to target where investments should be focused but also to increase accountability of NWOs in their decisions, as well as demonstrate organization strength to funding organizations. The GIS model established by the National Neighborhood Indicators Partnership and the Chattanooga Neighborhood Enterprise indicate that collection of Census data is essential to a GIS to be used for decision-making in housing investment. In addition, data on lending patterns and "underserved areas" will be needed for Neighborhood Reinvestment's long-term planning. On the local level, it will be necessary to acquire parcel information from local governments in order to get more specific, disaggregated data on areas that may be experiencing trouble due to tax delinquency, abandonment, or other conditions.

Since it has begun, the Great Lakes District's GIS initiative has been a success. Both Neighborhood Reinvestment staff and NeighborWorks organization staff have embraced the technology as a new way to look at their communities. In order to ensure continuing success, Neighborhood Reinvestment should:

- Explore forming partnerships with local governments in order to acquire data;
- Acquire necessary and available data;
- Attempt to develop partnerships with local community service agencies in order to create neighborhood indicators systems similar to those in the National Neighborhood Indicators Partnership;

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- Explore potential for collaboration with NNIP sites existing in District;
- Continue to seek out new sources of data and information pertinent to the missions of Neighborhood Reinvestment and NeighborWorks organizations;
- Continue to evaluate the needs of NeighborWorks organizations and be responsive to their information needs; and
- Keep up with emerging GIS technology, such as Internet Map Servers, in order to be a useful resource to NeighborWorks organizations.

In addition, in order to develop a tool useful in decision-making for neighborhood revitalization, Neighborhood Reinvestment should develop a series of benchmarks indicative of neighborhood decline in order to target areas where interventions should be focused.

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APPENDIX

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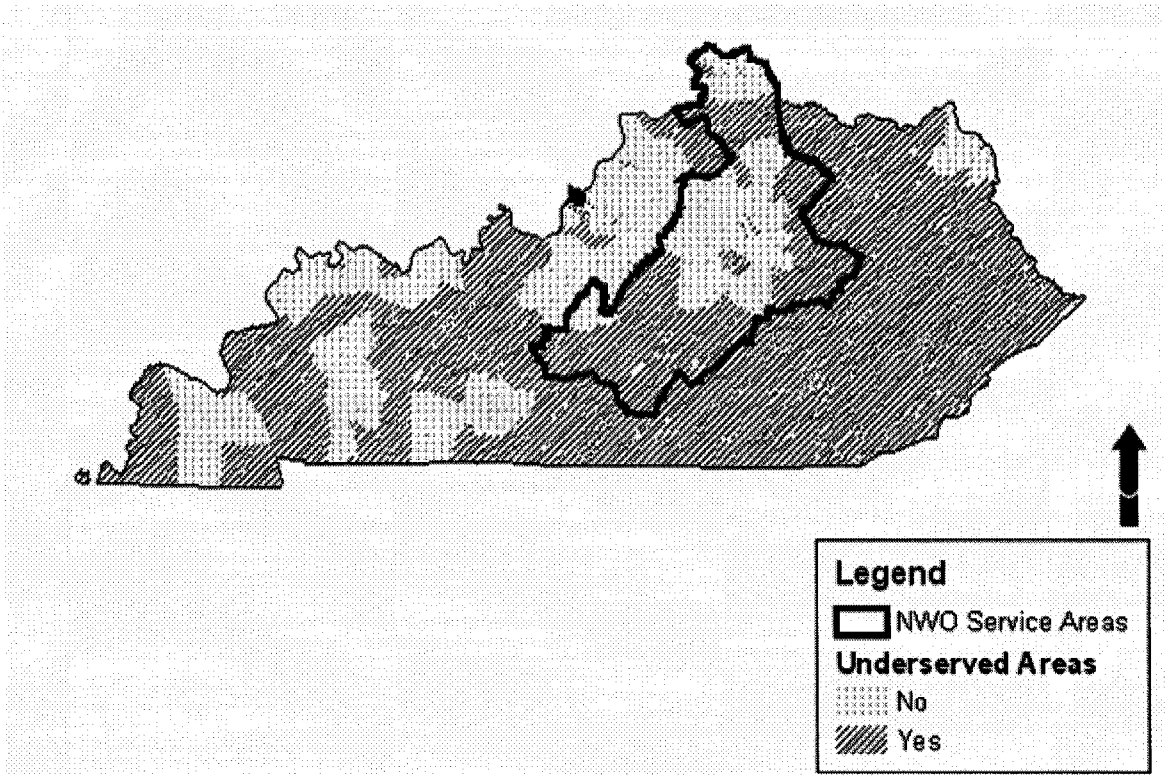

Figure 6: Underserved Areas and NeighborWorks Service Areas, Kentucky

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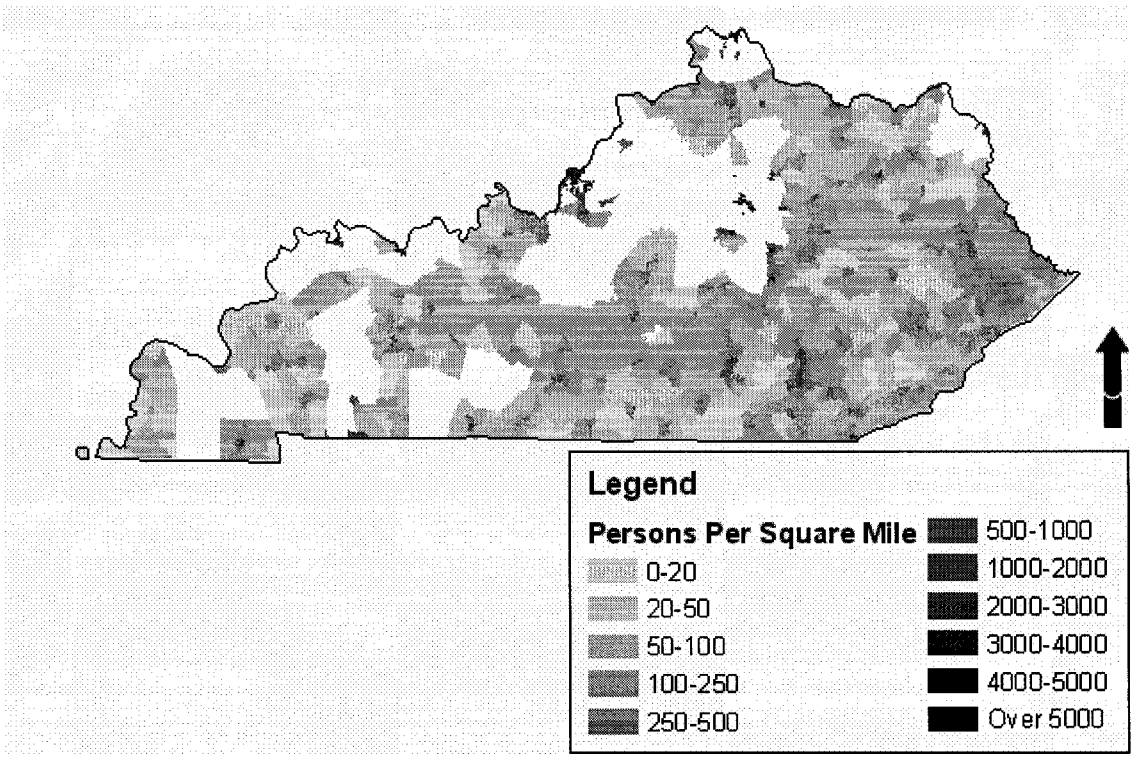

Figure 7: Underserved Areas by Population Density, Kentucky

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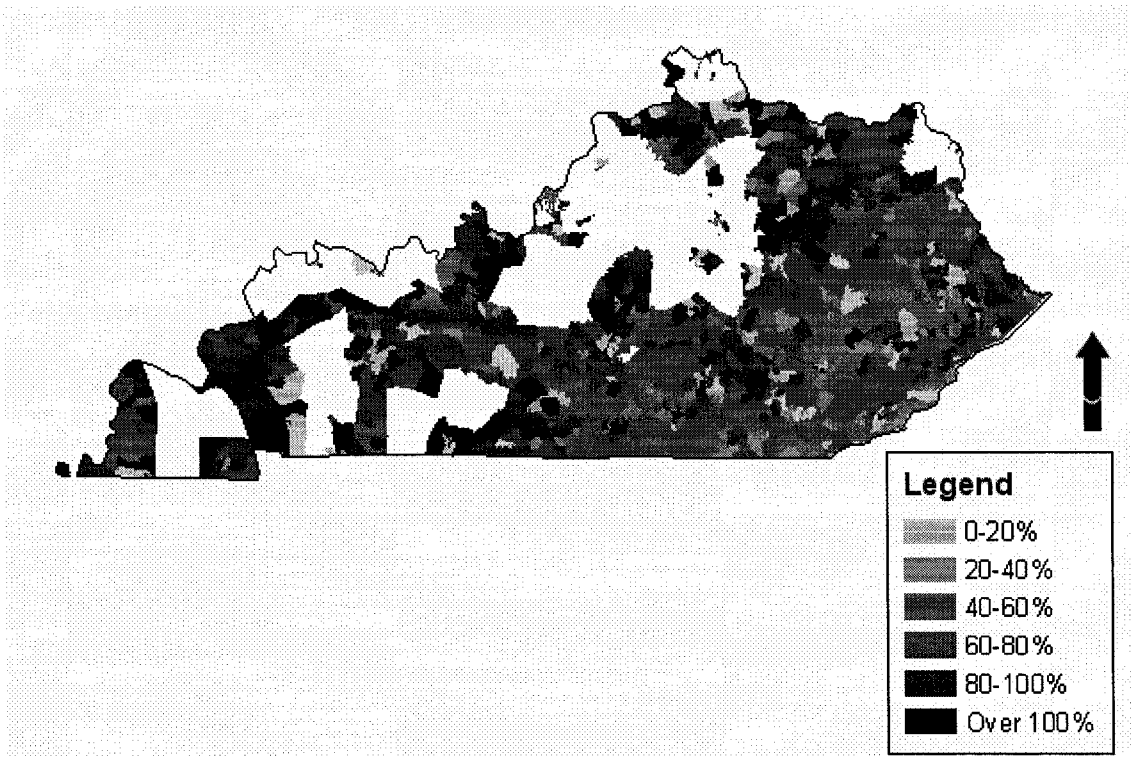

Figure 8: Underserved Areas by Percentage of Median Household Income, Kentucky

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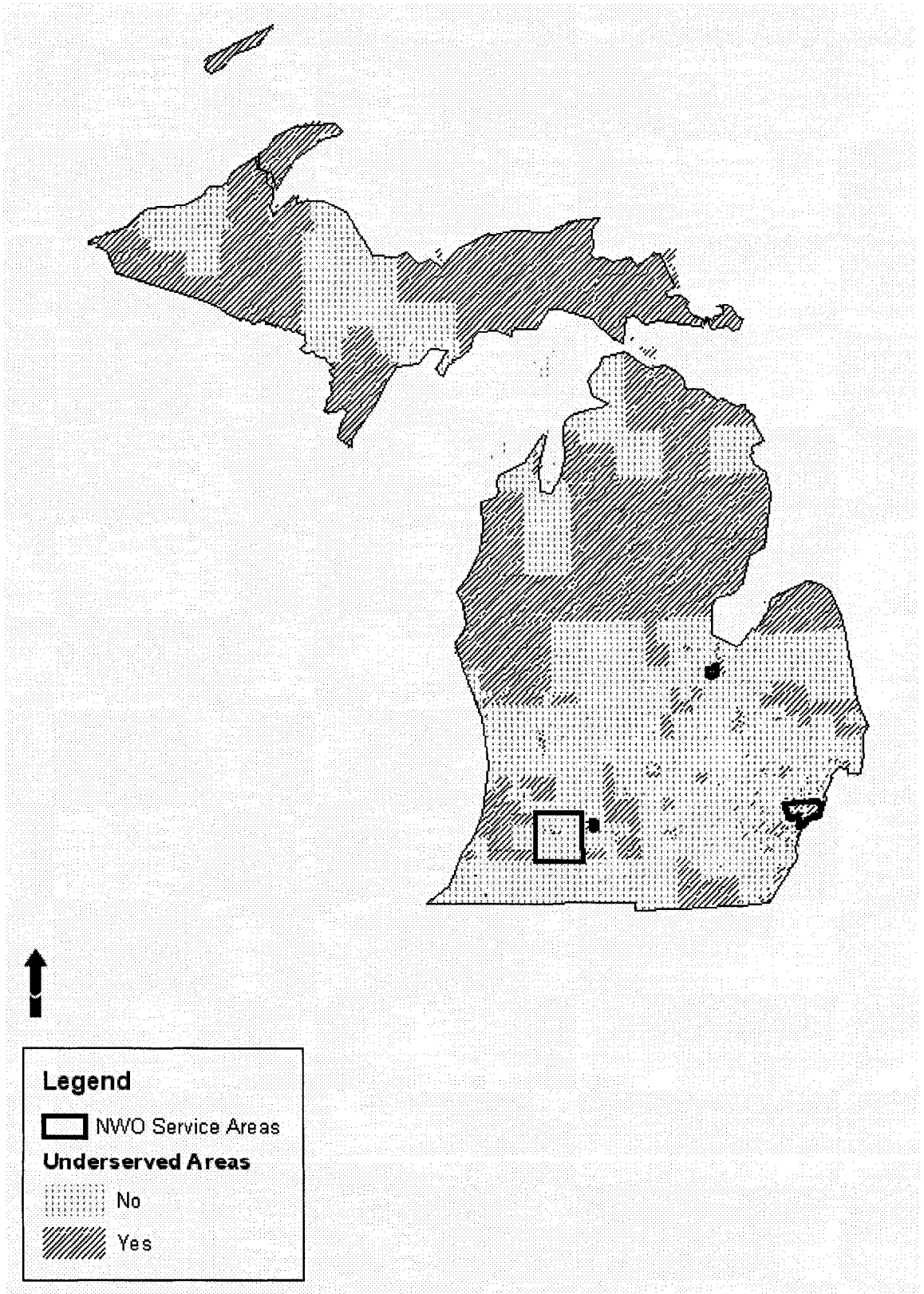

Figure 9: Underserved Areas and NeighborWorks Service Areas, Michigan

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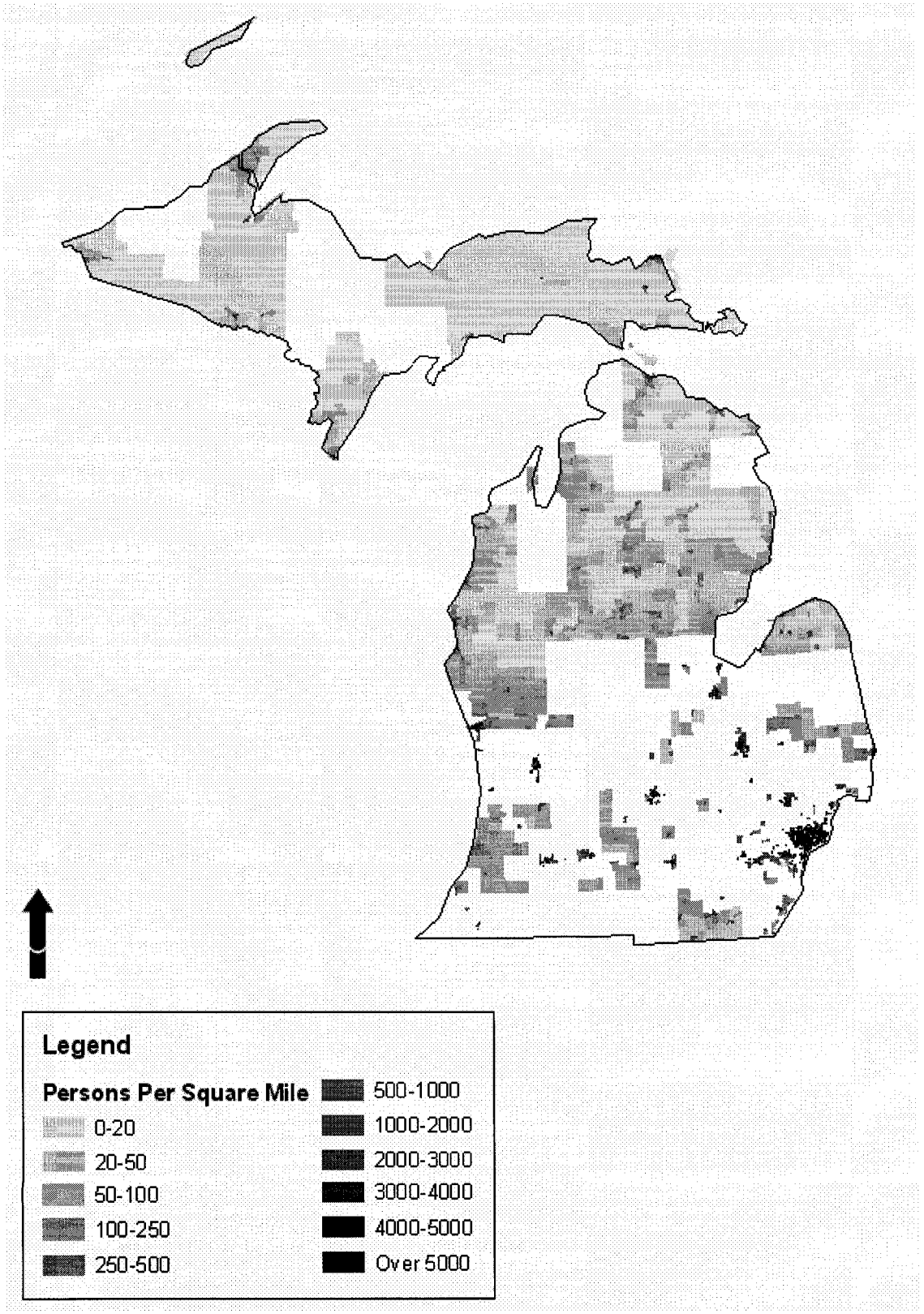

Figure 10: Underserved Areas by Population Density, Michigan

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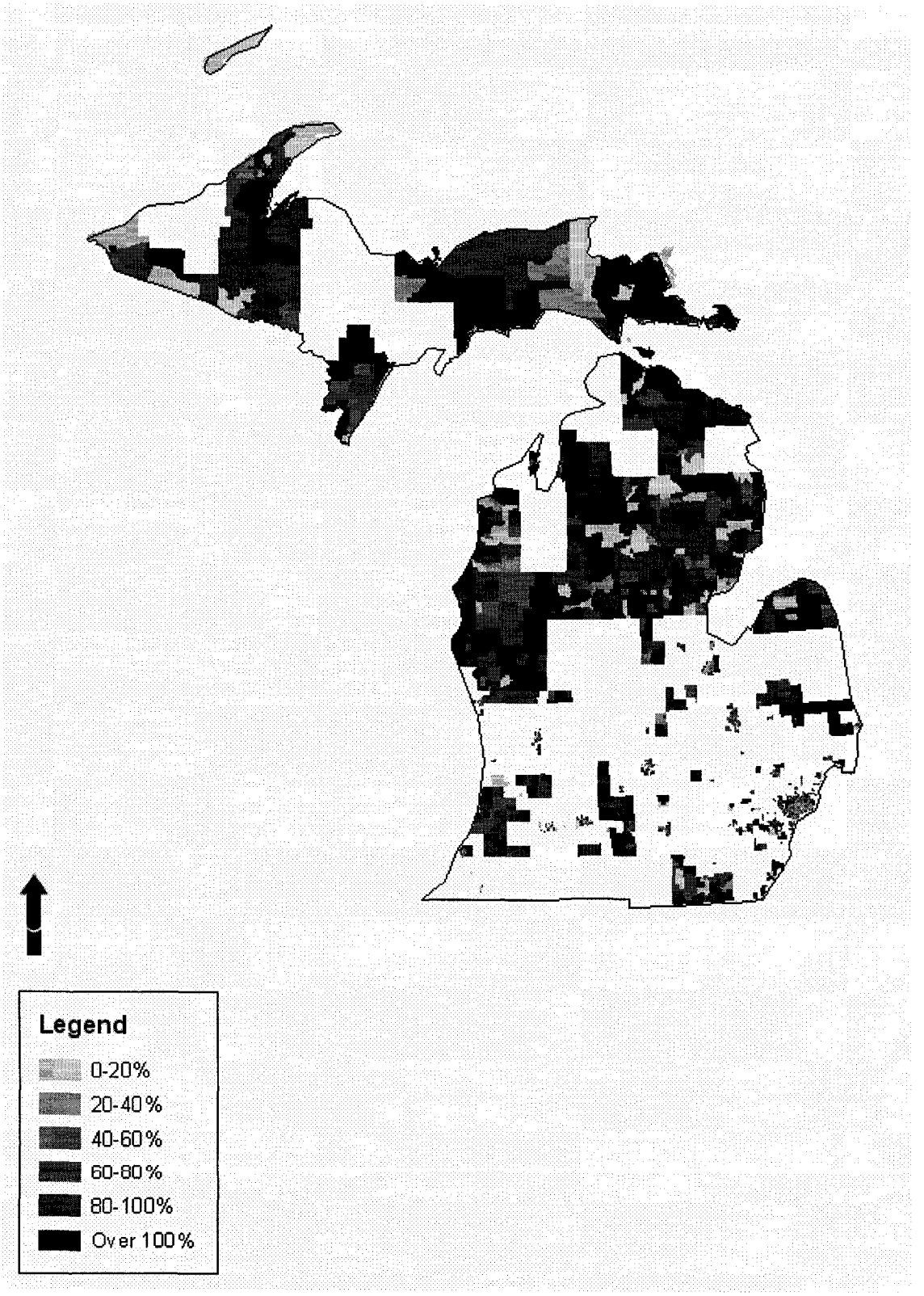

Figure 11: Underserved Areas by Percentage of Median Household Income, Michigan

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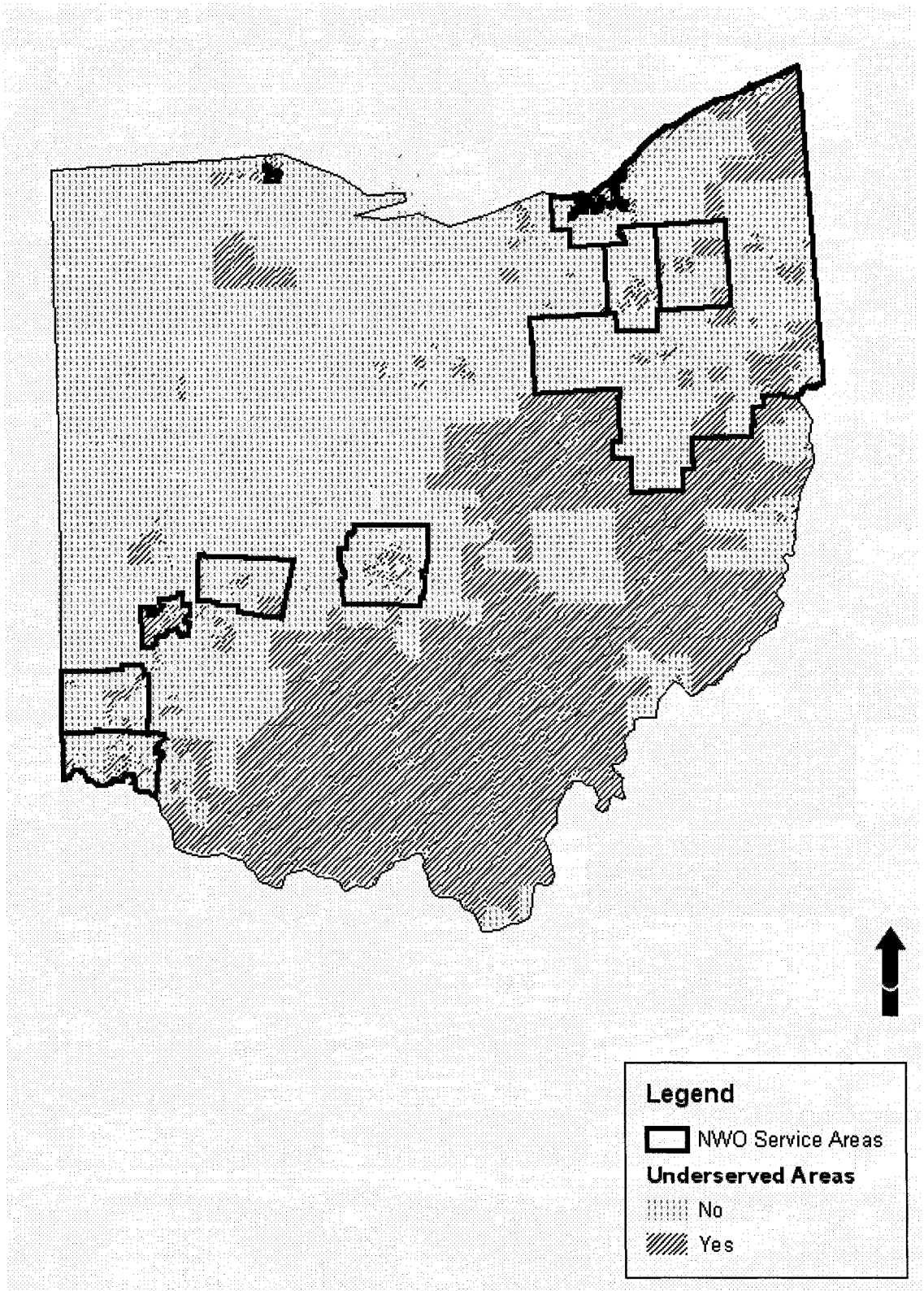

Figure 12: Underserved Areas and NeighborWorks Service Areas, Ohio

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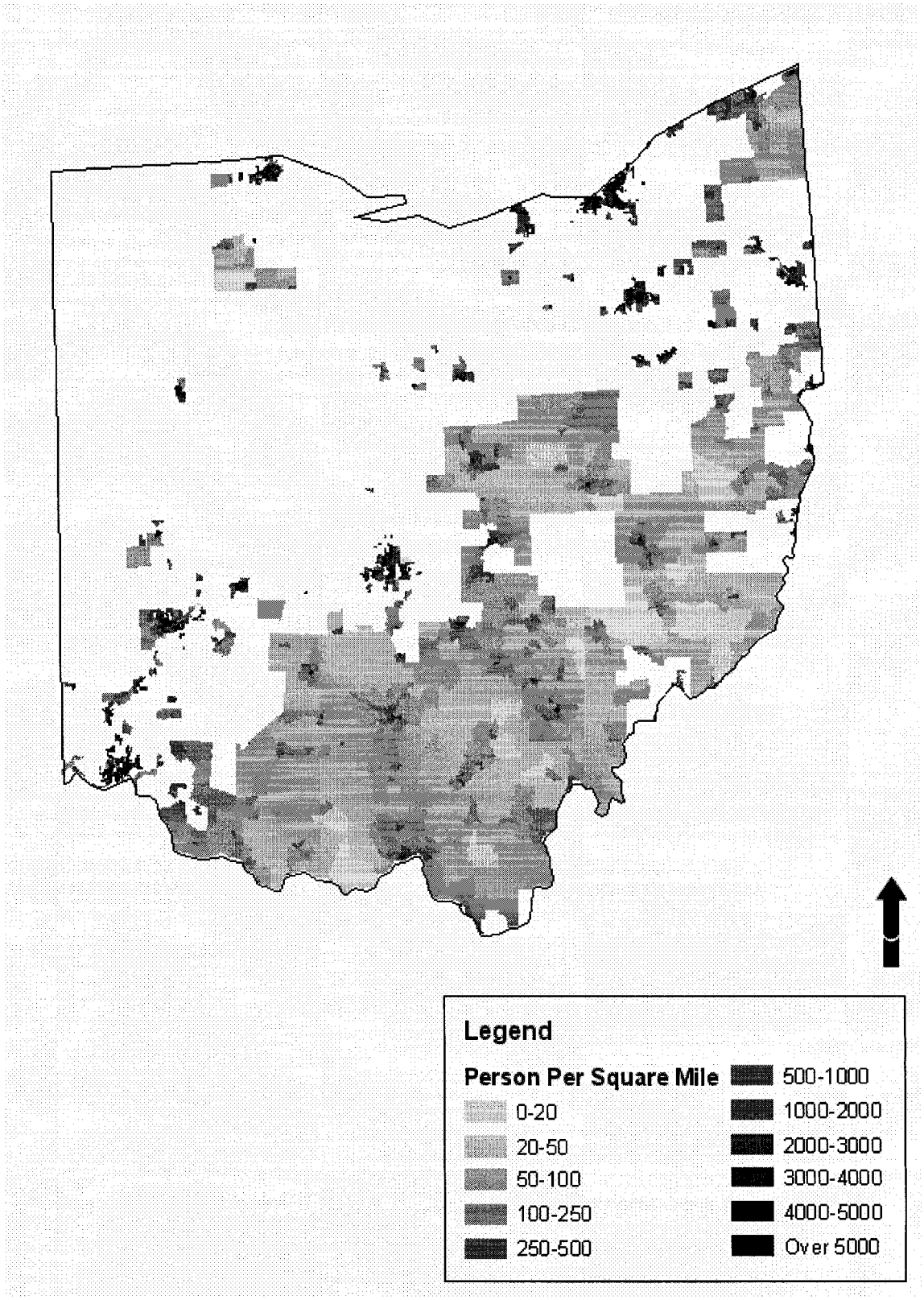

Figure 13: Underserved Areas by Population Density, Ohio

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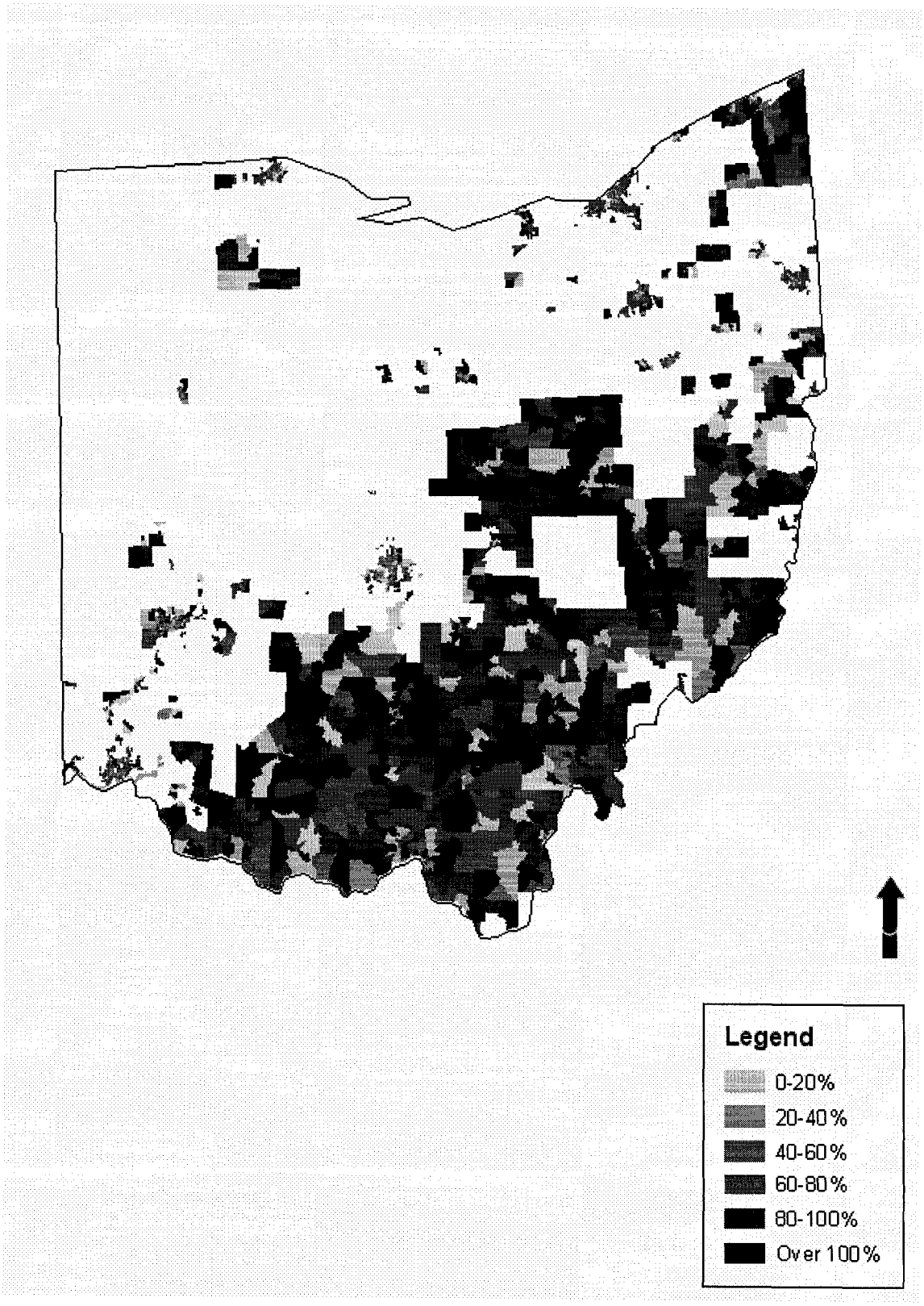

Figure 14: Underserved Areas by Percentage of Median Household Income, Ohio

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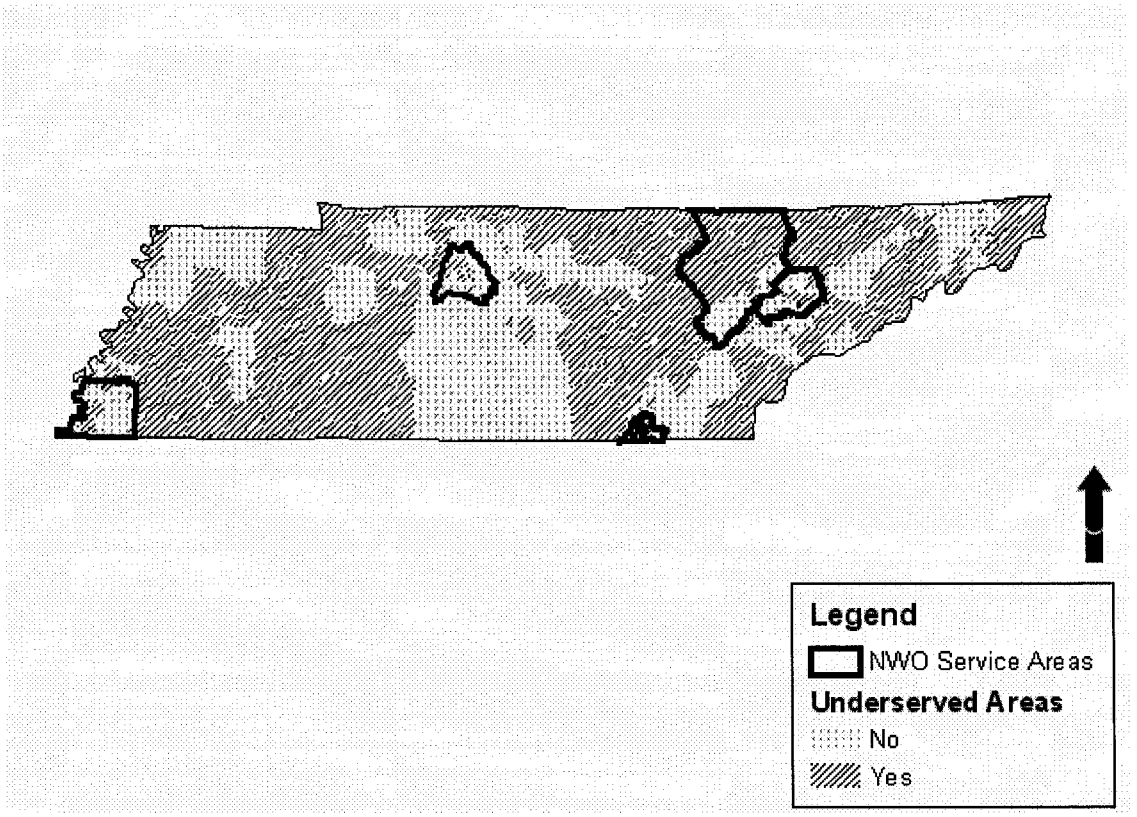

Figure 15: Underserved Areas and NeighborWorks Service Areas, Tennessee

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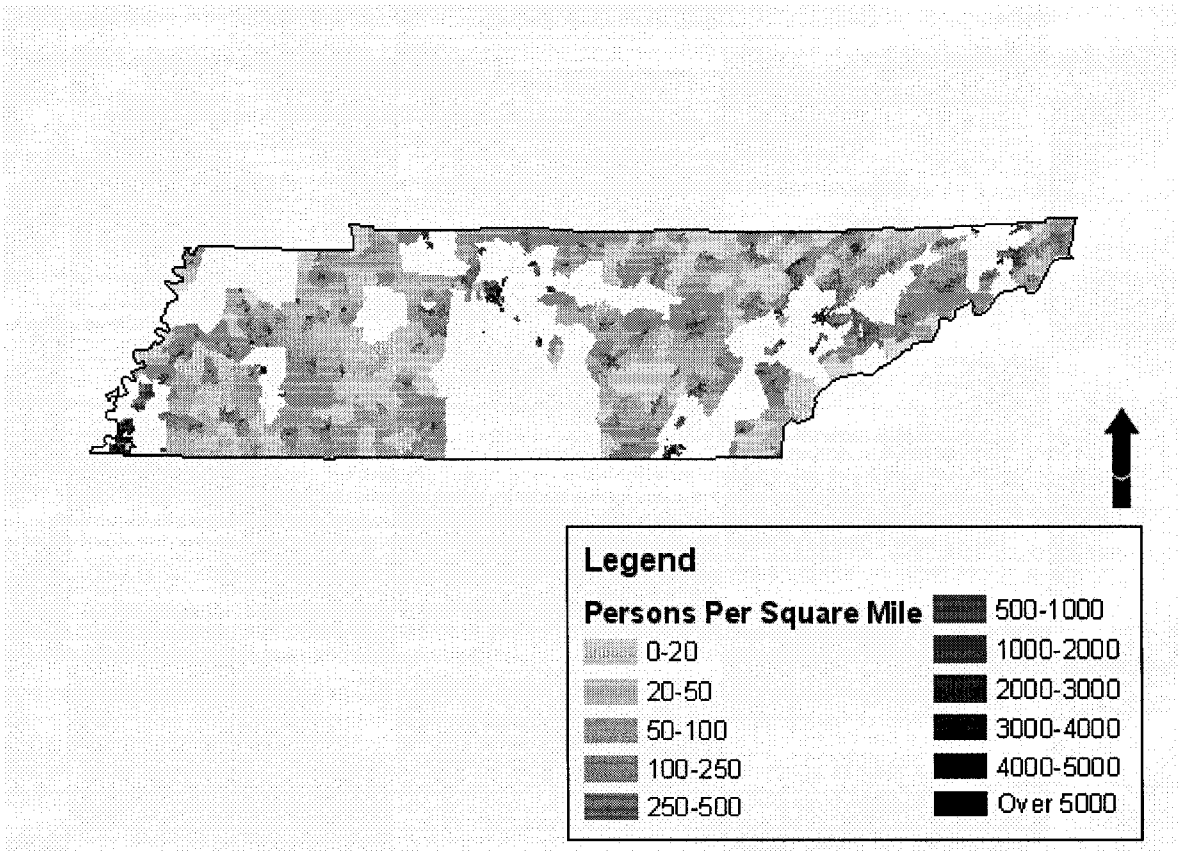

Figure 16: Underserved Areas by Population Density, Tennessee

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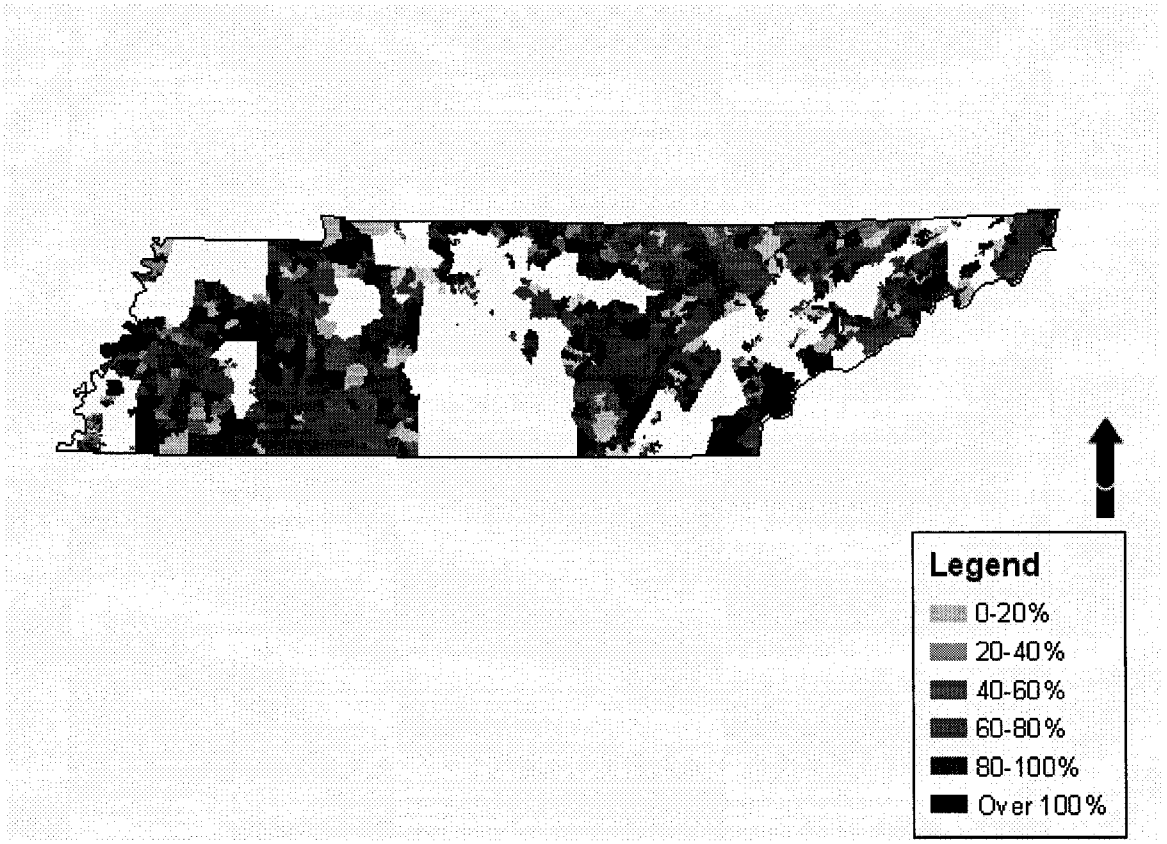

Figure 17: Underserved Areas by Percentage of Median Household Income, Tennessee

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REFERENCE LIST

Ayeni, Bola. 1997. "Spatial decision support systems for urban planning." in *Decision Support Systems in Urban Planning*, ed. Harry Timmerman, 3-22. London: E & FN Spon.

Biermann, Sharon M. 1999. "The Strategic Identification of Suitable Land for Low Income Housing: A Case Study from South Africa." in *Spatial Multicriteria Decision Making and Analysis*, ed. Jean-Claude Thill, 199-221. Aldershot, England: Ashgate Publishing Ltd.

Center on Urban Policy and Social Change. 1999. *Data Documentation.* <<http://povertycenter.cwru.edu/doc/alldoc.htm#DATA DEFINITIONS>> Accessed March 1, 2003.

Chattanooga Neighborhood Enterprise. 2002. *Chattanooga Neighborhood Enterprise.* <<http://www.cneinc.org/>> Accessed March 14, 2003.

Community Research Council. 2000. *General Links.* <<http://www.researchcouncil.net/general.htm>>. Accessed March 1, 2003.

Galster, George C. 1990. *Neighborhood Evaluations, Expectations, Mobility, and Housing Reinvestment: Measuring the Social Impacts of Community Development Corporations.* New York: Community Development Research Center, New School for Social Research.

Goss, John. 1995. "Marketing the new marketing: the strategic discourse of geodemographic information systems." in *Ground Truth*, ed. John Pickles, 130-170. New York: The Guilford Press.

Kingsley, G Thomas (Ed.). 1999. *Building and Operating Neighborhood Indicators Systems: A Guidebook.* Washington DC: The Urban Institute.

Blackford, Loren and Lisa Mueller. 2002. "Partners Power GIS." in *Shelterforce Online*: 126 (November/December 2002). Available from <<http://www.nhi.org/online/issues/126/gispartners.html>>.

National Neighborhood Indicators Partnership. 2003a. *NNIP Activities.* <<http://www.urban.org/nnip/activities.html>> Accessed February 19, 2003.

National Neighborhood Indicators Partnership. 2003b. NNIP: Partners. <<http://www.urban.org/nnip/loc_list.html>> Accessed February 19, 2003.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.

National Neighborhood Indicators Partnership. 2003c. *NNIP: Partners- Chattanooga.* <<http://www.urban.org/nnip/desc_cha.html>> Accessed March 2, 2003.

National Neighborhood Indicators Partnership. 2003d. *NNIP: Partners- Indianapolis.* <<http://www.urban.org/nnip/desc_ind.html>> Accessed March 2, 2003.

National Neighborhood Indicators Partnership. 2003e. *NNIP: Partners- Louisville.* <<http://www.urban.org/nnip/desc_lou.html>> Accessed March 2, 2003.

Neighborhood Reinvestment Corporation. 2002a. *About Neighborhood Reinvestment and the NeighborWorks Network.* <<http://www.nw.org/network/aboutUs/aboutUs.html>> Accessed November 15, 2002.

Neighborhood Reinvestment Corporation. 2002b. *Neighborhood Reinvestment Mission.* <<http://www.nw.org/network/aboutUs/nrc/nrMission.html>> Accessed May 12, 2003.

Neighborhood Reinvestment Corporation. 2002c. *Neighborhood Reinvestment Strategic Goals.* <<http://www.nw.org/network/aboutUs/aboutUs/nrc/nrStratGoals.html>> Accessed November 15, 2002.

Neighborhood Reinvestment Corporation. 2002d. *Network Profiles.* <<http://sqlweb.nw.org/profile/AllStatesBody.asp?select=5&act=Go&sort=1>> Accessed April 30, 2003.

O'Looney, John. 1997. *Beyond Maps: GIS and Decision Making in Local Government.* Washington, D.C.: International City/County Management Association.

PolicyLink. 2002. *Community Mapping.* <<http://www.policylink.org/equitabledevelopment/>> Accessed October 2, 2002.

Sawicki, David S. and Patrice Flynn. 1996. "Neighborhood Indicators: A Review of the Literature and an Assessment of Conceptual and Methodological Issues." *Journal of the American Planning Association,* 62,2: 165-183.

Social Assets and Vulnerabilities Indicators (SAVI). 2003. *SAVI Interactive- What is SAVI?* <<http://www.savi.org/polis/savi/WhatIs.htm>> Accessed March 3, 2003.

Southeast Tennessee Information Service. 2003. *Data.* <<http://www.setnis.org/index.asp?id=data.htm>> Accessed March 2, 2003.

Thompson, Phil. 2003. "RE: GIS Question." April 8, 2003. Personal email.

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Worrall, Les, ed. 1991. "GIS for spatial analysis and spatial policy: developments and directions." in *Spatial Analysis and Spatial Policy using Geographic Information Systems*, 1-11. London: Belhaven Press.

GIS DATA

Geography Network. 2000. *Census 2000 TIGER/Line Data.* <<http://www.esri.com/data/download/census2000_tigerline/index.html>> Accessed September 30, 2002.

HUD User. 2002. *2001 Geographically Targeted Goal Data.* <<http://www.huduser.org/datasets/gse.html>> Accessed December 13, 2002.

United States Census. 2002. *Summary File 3.* <<http://www.census.gov/>>. Accessed February 2, 2003.

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